QK1
.W8
1961-66
v.3

WRIGHTIA

A Botanical Journal

VOLUME 3

Numbers 1–8 and Index

1961—1966

EDITOR

CYRUS LONGWORTH LUNDELL

PUBLISHED BY

TEXAS RESEARCH FOUNDATION

RENNER, TEXAS

MISSOURI BOTANICAL
GARDEN LIBRARY

Percy H. Gentle

PERCY H. GENTLE

1890–1958

Percy H. Gentle was born in Belize, British Honduras on December 3, 1890 and died at Stann Creek on August 16, 1958. Baptised Percival Hildebert Gentle, he was educated in local schools.

In 1931 he accompanied Professor H. H. Bartlett on the botanical expedition of the University of Michigan-Carnegie Institution of Washington to Peten. Subsequently through 1932 he collected in the Colony for Professor Bartlett. He was Dr. C. L. Lundell's field assistant on expeditions to Peten and British Honduras in 1933 and in 1936. Also, in 1933 Mr. Gentle began work under Dr. Lundell's sponsorship in British Honduras, and his botanical exploration was continuous thereafter until his death. Covering a span of nearly twenty-six years, his series totals 9755, and he made as many as twenty specimens of each number. The first set of his collection, for the period 1931–1943, is in the University of Michigan Herbarium. The Lundell Herbarium contains the complete set from 1944 through 1958, and much of his earlier material as well. His name is commemorated by the genus *Gentlea* (Myrsinaceae), and by numerous species named for him.

Percy H. Gentle will go down in history as the first important botanical explorer of his race.

Copyright, 1966
TEXAS RESEARCH FOUNDATION
all rights reserved

Printed in the U.S.A.
Cayuga Press, Inc.
Ithaca, New York

CONTENTS OF VOLUME 3

Complete in Eight Numbers

Number 1, December 15, 1961

Plantae Mayanae—IV. New Species, Nomenclatural Changes, and New Records for Trees and Shrubs of Mexico and Central America. By Cyrus Longworth Lundell 1

Number 2, May 15, 1962

Plantae Mayanae—V. Petenaea cordata, a New Genus and Species in the Elaeocarpaceae, and Other Taxonomic Notes. By Cyrus Longworth Lundell 21

Wood Anatomy of Petenaea cordata Lundell (Elaeocarpaceae). By B. Francis Kukachka 36

Number 3, March 15, 1963

Reproduction of the Lovegrasses, the Genus Eragrostis—I. E. chloromelas Steud., E. curvula (Schrad.) Nees, E. Lehmanniana Nees and E. superba Peyr. By L. J. Streetman 41

Reproduction of the Lovegrasses, the Genus Eragrostis—II. E. bicolor Nees, E. plana Nees, E. intermedia Hitchc. and E. obtusa Munro. By L. J. Streetman 52

Number 4, March 15, 1963

New Species of Parathesis (Myrsinaceae). By Cyrus Longworth Lundell 61

Number 5, December 31, 1963

Studies of the American Myrsinaceae—I. By Cyrus Longworth Lundell 77

Novelties in Colubrina Including Cormonema and Hybosperma (Rhamnaceae). By Marshall C. Johnston 91

Number 6, December 31, 1964

Studies of the American Myrsinaceae—II. By Cyrus Longworth Lundell 97

A Variety of Jacquinia aurantiaca from Peten. By Cyrus Longworth Lundell 114

Notes on the Myrtaceae of Guatemala. By Cyrus Longworth Lundell. 115

Number 7, April 30, 1965

Studies of Tropical American Plants—II. By Cyrus Longworth Lundell 117
Some Additions and Corrections to the Flora of Texas. By Donovan S. Correll 126
The Genus Scleria in the Yucatan Peninsula. By Earl L. Core 141

Number 8, May 31, 1966

Studies of Tropical American Plants—III. By Cyrus Longworth Lundell 161
The Mexican and Central American Species of Dichapetalum. By Cyrus Longworth Lundell 173
A Method for Applying Mystox (Lauryl Pentachlorphenate) to Protect Mounted Herbarium Specimens. By Cyrus Longworth Lundell and Richard Kirkham 177
A New Pinyon Variety from Texas.
By Elbert L. Little, Jr. 181
Two New Plants in Texas.
By Donovan S. Correll 188
Studies of the American Myrsinaceae—III.
By Cyrus Longworth Lundell 192

June 15, 1966

Index 201

VOLUME 3 DECEMBER, 1961 NUMBER 1

WRIGHTIA

A BOTANICAL JOURNAL

CONTENTS

Plantae Mayanae—IV. New Species, Nomenclatural Changes, and New Records for Trees and Shrubs of Mexico and Central America. By Cyrus Longworth Lundell 1

MISSOURI BOTANICAL GARDEN LIBRARY
RECEIVED
JAN 2 - 1962

PUBLISHED BY
TEXAS RESEARCH FOUNDATION
RENNER, TEXAS

WRIGHTIA

WRIGHTIA, a botanical journal, is a publication of Texas Research Foundation. The contributions are by staff members and collaborators. Each volume will contain a series of numbers, to be issued at irregular intervals. The subscription price for Volume 3 is $12.00, postpaid.

VOLUME 3, NUMBER 1
ISSUED DECEMBER 15, 1961

Printed in the U.S.A.
Etheridge Printing Company
Dallas, Texas

BV 000 4498
on TROPICOS:
names, typs

WRIGHTIA

VOLUME 3 DECEMBER, 1961 NUMBER 1

PLANTAE MAYANAE—IV

NEW SPECIES, NOMENCLATURAL CHANGES, AND NEW RECORDS FOR TREES AND SHRUBS OF MEXICO AND CENTRAL AMERICA

CYRUS LONGWORTH LUNDELL

In most tropical areas, including southern Mexico and Central America, plant exploration has been sporadic, and grossly inadequate for an understanding of the species. Even common forest trees of primary economic importance, such as mahogany, sapodilla and copal, are still imperfectly understood taxonomically because of the incompleteness of materials for study. Most of the collections on which our knowledge of the flora is based are either flowering or fruiting specimens, and sometimes only sterile twigs. Practically all of the species are poorly represented in herbaria. Extensive areas have not been visited, much less explored, and intensive field work in any locality, even the best known, turns up surprising plant discoveries.

Through financial support and encouragement of resident collectors, and through exchange and purchase of specimens, extensive collections have been accumulated at Renner from southern Mexico, Guatemala, and British Honduras. These have been supplemented by substantial collections obtained in the plant resources survey of Peten in 1959, 1960 and 1961. These materials, although only partially representative of the flora, have added notably to our knowledge of the plants of the area occupied by the ancient Maya.

My field studies since 1959 and those of my Guatemalan assistant, Elias Contreras, have been made possible by grants from The Rockefeller Foundation, and from the American Philosophical Society through its Penrose and Michaux funds. This assistance is gratefully acknowledged.

HAMAMELIDACEAE

Matudaea hirsuta Lundell, sp. nov.

Arbor, ad 12 m. alta, stellato-hirsuta; folia subcoriacea, petiolata, petiolo 2–5 mm. longo; lamina lanceolata vel ovato-elliptica, 4–7.5 cm. longa,

1.8–3.7 cm. lata, apice obtusa vel acuminata, basi rotundata vel subcordata, 3- vel 5-nervia; inflorescentia spicata; calyx ad 2.2 mm. longus; antherae stellato-lepidotae, oblongae, 2–3 mm. longae, apiculatae; styli 2, usque ad 3 mm. longi.

Tree, up to 12 m. high, twigs short and slender, densely hirsute with long slender stellate hairs. Leaves subcoriaceous, paler beneath, petiolate, the petioles hirsute, 2 to 5 mm. long; the leaf blades sparsely stellate pubescent on both surfaces, densely so along the midvein, barbate beneath in axils of primary veins, lanceolate or ovate-elliptic, 4 to 7.5 cm. long, 1.8 to 3.7 cm. wide, usually 3-nerved, rarely 5-nerved at base, reticulate veined, the base unequal, rounded or subcordate, apex obtuse to acuminate. Inflorescence axillary, spicate, congested, pubescent with short stellate hairs. Flowers sessile, crowded. Calyx up to 2.2 mm. long, stellate-lepidote. Filaments and anthers stellate-lepidote, the anthers oblong, 2 to 3 mm. long, apiculate. Ovary densely stellate-lepidote; styles 2, up to 3 mm. long, stigmatic on inner surface apically.

MEXICO: Mexico, District of Temascaltepec, Nanchititla, barranca by the water, Feb. 16, 1935, *Geo. B. Hinton 7381* (type, US), tree 12 m.; same locality, barranca, Jan. 4, 1933, *Hinton 3090* (F, US), tree 10 m.; same locality, barranca, June 14, 1934, *Hinton 6163* (US), tree 10 m.

The discovery of a second species of *Matudaea* extends the range of this unique genus northward from Honduras.

In its hirsute twigs, somewhat smaller flowers, and differences in the general aspect of the leaves, *M. hirsuta* is amply distinct from *M. trinervia* Lundell. The anthers are apiculate in *M. hirsuta*, but the development of the apical connective is not nearly as pronounced as in the generic type. In *M. trinervia* the sparse indumentum is stellate-lepidote except for the barbate axils of the primary veins on the undersurface of the leaves.

MATUDAEA TRINERVIA Lundell, Lloydia 3: 210. 1940.

MEXICO: Chiapas, Mt. Ovando, April 9–12, 1937, *Eizi Matuda S-194* (type, MICH; isotypes, F, LL, US); Mt. Ovando, alt. 2000 m., Nov. 14–18, 1939, *Matuda 3984* (F, LL, US), tree, 10 m. high; Siltepec, Rodeo, 2800 m., Aug. 1–5, 1941, *Matuda 4582* (F, LL, US); Sierra Madre, Tres Cruces, 2600 m., Feb. 24, 1945, *Matuda 5042* (F, LL), a tree 10–13 m. high. GUATEMALA: Department of Alta Verapaz, wet forest near Tactic, above the bridge across Rio Frio, alt. about 1400–1500 m., Mar. 30, 1941, *Paul C. Standley 90442* (F, US), shrub; mountains along road between Tactic and the divide on road to Tamahu, wet mixed forest, alt. 1500–1600 m., Apr. 1–7, 1941, *Standley 91320* (F), small tree; same locality and date, *Standley 91327* (F), small tree. HONDURAS: Department of Intibuca, vicinity of La Esperanza and Intibuca, oak forest, alt. 1500–1600 m., Jan. 31–Feb. 12, 1950, *Standley 25512* (F, US), tree 7 m., leaves very lustrous, flowers cream; same locality and date, riverbank, *Standley 25570* (F, US), tree 10 m., trunk 40 cm. diam., bark gray, almost smooth, flowers cream.

In the Guatemalan specimens, all sterile, the leaves are not barbate in the axils on the undersurface. Other minor differences in the Guatemalan and Honduran specimens indicate that one or more varieties may be represented, but insufficient material is available to clarify the relationships.

The extension of the range of the species southward from Chiapas into the mountains of Guatemala and Honduras indicates further the inadequacy of botanical exploration in Central America.

BURSERACEAE

Bursera longicuspis Lundell, sp. nov.

Arbor; folia 3–5-foliolata, raro 7-foliolata; foliola terminalia longe petiolata, ovato-elliptica, apice cuspidato-acuminata, basi rotundata vel acutiuscula; foliola lateralia petiolata, petiolo 3–14 mm. longo, lamina ovata, 4–8 cm. longa, 1.7–4.5 cm. lata, apice acuminata vel abrupte cuspidato-acuminata, basi rotundata vel emarginata; pedicelli 3–6 mm. longi; sepala 5, parva, ovata; petala 5, reflexa, 2.2–2.8 mm. longa; stamina 10; ovarium glabrum; pedicelli fructiferi ad 8 mm. longi; capsula glabra, 3-valvata.

Tree, twigs rather slender, the new growth densely puberulent, glabrate early. Leaves large, 3- or 5-foliolate, rarely 7-foliolate, glabrous or essentially so, with slender petiole and rachis, the petioles 3.5 to 7.5 cm. long; leaflets thin (young), the lateral borne on slender petiolules 3 to 14 mm. long, the terminal petiolule up to 3.5 cm. long; blades of leaflets ovate or ovate-elliptic, 4 to 8 cm. long, 1.7 to 4.5 cm. wide, apex acuminate or abruptly cuspidate-acuminate, base of lateral leaflets rounded, usually emarginate, base of apical leaflet rounded to acutish, midvein evident on both surfaces, the primary veins 5 to 7 on each side. Flowers dioecious. Inflorescence slender, glabrous, up to 10 cm. long. Pedicels slender, 3 to 6 mm. long. Sepals 5, small, ovate, less than 1 mm. long. Petals 5, reflexed, 2.2 to 2.8 mm. long. Ovary glabrous, narrowed above into a short style, stigma 3-lobed. Stamens 10, anthers in staminate flowers oblong, 1 mm. long, filaments slender, 1.3 to 2 mm. long. Capsule 3-valvate, glabrous, about 1 cm. long (immature), the fruiting pedicels slender, up to 8 mm. long.

MEXICO: Chiapas, Amatenango del Valle, alt. 1835 m., June 12, 1945, *Eizi Matuda 5853* (type, LL, pistillate fls. & frs.), tree; Trapichito, near Comitan, alt. 1350 m., June 2, 1945, *Matuda 5758* (LL, staminate fls.).

Related to *B. longipes* (Rose) Standl., *B. longicuspis* differs at once in having fewer leaflets, usually 3 or 5, in its 5-merous perianth, and in its puberulent twigs which are glabrescent early. The thin ovate leaflets are cuspidate-acuminate. *B. permollis* Standl. & Steyerm. of Guatemala may

be related, but it differs in its 3-foliolate leaves, very short and thick pedicels, and in being densely pubescent.

Bursera Simaruba (L.) Sarg. var. **yucatanensis** Lundell, var. nov.

A typo ramulis novellis velutinus differt.

From the typical glabrous form of *B. Simaruba*, the variety differs in its densely velutinous twigs. The inflorescence, petioles, petiolules, and midvein and primary veins on undersurface of leaflets are less densely pubescent with similar hairs.

GUATEMALA: Department of Peten, Remate, in high forest bordering the lake, about 22 km. west of the village, May 29, 1960, *Elias Contreras 1034* (type, LL), tree, 4 in. diam., 25 ft. high, fruit green, "*chacah*".

The confusion in the interpretation of the species of *Bursera* with large entire leaflets and exalate rachis makes hazardous any proposals for new names in the complex. But most of the collections from the Yucatan Peninsula are referable to the velutinous var. *yucatanensis*. However, the typical completely glabrous form of *B. Simaruba* is present also.

Bullock (Kew Bull. p. 166. 1938) has referred a collection from the State of Mexico, *Geo. B. Hinton 10369* (LL), to *B. longipes* (Rose) Standl., but this collection is identical to *Contreras 1034* from Guatemala. Hence var. *yucatanensis* extends into Central Mexico, in accordance with my interpretation of *B. Simaruba*.

PROTIUM COPAL (Schlecht. & Cham.) Engl., in DC. Mon. Phan. 4: 83. 1883; Swart, Rec. Trav. Bot. Neerland. 39: 330. 1942.

BRITISH HONDURAS: Toledo District, Edwards Road beyond Columbia, near Carmelita Camp, in high ridge on hilltop, May 1, 1951, *Percy H. Gentle 7317* (LL), tree, 10 in. diam., "*copal*". GUATEMALA: Department of Peten, south of Sayaxche, alt. 50 m., May 3, 1942, *Julian A. Steyermark 46220* (LL); Tikal National Park, Tikal, in *ramonal* covering the ruins, Feb. 11, 1959, *C. L. Lundell 15486* (LL), tree, 10 in. diam., 45 ft. high, "*copal*"; same locality, Feb. 23, 1959, *Lundell 15708* (LL), tree, 10 in. diam., 50 ft. high, "*copal*", "*pom*"; Uaxactun, so. of the ruins, in *ramonal*, Feb. 29, 1960, *Lundell 16640* (LL), tree, 7 in. diam., 30 ft. high, flowers greenish, "*copal*", "*pom*"; Tikal National Park, Tikal, in *ramonal* covering the ruins, Feb. 28, 1961, *Lundell 16804* (LL), tree, 10 in. diam., 60 ft. high, "*copal*"; same locality, growing on top of Temple V, Feb. 9, 1960, *Elias Contreras 614* (LL), tree, 5 in. diam., 15 ft. high, "*copal*"; Remate, bordering the lake, about 16 km. sw.w. of the village, Apr. 13, 1960, *Contreras 829* (LL), tree, 6 in. diam., 30 ft. high. MEXICO: San Luis Potosi, Tamazunchale, in wet second growth on hillside, alt. 200 m., July, 1937, *C. L. Lundell & Amelia A. Lundell 7126* (LL), tree, 30 cm. diam., 15 m. high, "*copal*"; same locality, April 14, 1944, *Efraim Hernandez X. 155*, shrub, 3 m., "*copal*".

The staminate flowers are sessile or subsessile, while the pistillate flowers are short pedicellate. All flowers do not have pedicels "2 mm. long" as described by Swart (1.c.), but otherwise the specimens agree remarkably well with his description of the species.

P. Copal var. *glabrum* (Rose) Swart (1.c., p. 332) is reported from Peten and British Honduras. I have been unable to distinguish the variety in any of the material at hand.

PROTIUM MULTIRAMIFLORUM Lundell, Field Lab. 6: 11. 1937; Swart, Rec. Trav. Bot. Neerland. 39: 305. 1942.

BRITISH HONDURAS: El Cayo District, Valentin, in advanced forest, June 24, 1936, *C. L. Lundell 6212* (type, MICH; isotype, LL), tree, 15 cm. diam., 10 m. high; near Camp 6, on hillside, March 9, 1938, *Percy H. Gentle 2316* (LL), tree, 9 in. diam., *"copal";* Humming Bird Highway, 47 Miles Section, in high ridge on hillside, Feb. 27, 1956, *Gentle 9041* (LL), tree, 8 in. diam., flowers yellow, *"mountain copal";* Toledo District, Rio Grande, in give and take ridge, Oct. 12, 1944, *Gentle 4875* (LL), tree, 8 in. diam., creamish colored flowers, *"copal";* near Jacinto Creek, in cohune ridge, May 2, 1946, *Gentle 5560* (LL), tree, 9 in. diam., flowers pale yellow, *"copal";* near Orange Point, in cohune ridge, Oct. 18, 1951, *Gentle 7484* (LL), tree, 7 in. diam., *"copal".* GUATEMALA: Department of Peten, Tikal, in secondary growth bordering airfield, Feb. 24, 1959, *Lundell 15740* (LL), small tree; Tikal National Park, on Remate Road, in *zapotal,* July 6, 1959, *Lundell 16207* (LL), tree, 5 in. diam., 30 ft. high, flowers green; Dolores, 2 km. so. of village, in low forest bordering *pinal,* May 3, 1961, *Elias Contreras 2245* (LL), tree, 8 in. diam., 40 ft. high, flowers yellow-green, *"copal";* Dolores, on Rio Mopan trail, in high forest, June 29, 1961, *Contreras 2560* (LL), tree, 10 in. diam., 50 ft. high, flowers greenish, *"copal";* between Santo Toribio and San Juan, km. 55 of Flores Road, in high forest, Aug. 28, 1961, *Contreras 2807* (LL), tree, 8 in. diam., 40 ft. high, *"copal".*

Buds of *P. multiramiflorum* are densely strigillose. Twigs and young leaves are sparsely short strigillose, but mature specimens are essentially glabrous. The species has been known heretofore only from the two collections cited in the original description from southern British Honduras.

PROTIUM SCHIPPII Lundell, Field Lab. 6: 12. 1937; Swart, Rec. Trav. Bot. Neerland. 39: 364. 1942.

BRITISH HONDURAS: El Cayo District, Humming Bird Highway, in cohune ridge on hillside, Apr. 25, 1955, *Percy H. Gentle 8686* (LL), tree, 6 in. diam., flowers yellow, *"copal";* Stann Creek District, Big Creek, on creek bank, Dec. 19, 1937, *Gentle 2137* (LL), tree, 9 in. diam.,; Middlesex, in high ridge, Apr. 1, 1939, *Gentle 2728* (LL), tree, 8 in. diam., *"copal";* Stann Creek Valley, Baboon Ridge, in high ridge, Jan. 23, 1940, *Gentle 3154* (LL), tree, 7 in. diam., *"white copal";* Stann Creek Valley, Blue Mountain Valley, in high ridge, Feb. 23, 1940, *Gentle 3230* (LL), tree, 7 in. diam., flowers white, *"white copal";* Humming Bird Highway beyond Middlesex, in high ridge, creekside, June 20, 1953, *Gentle 7959* (LL), tree, 8 in. diam., flowers creamish

colored, *"copal"*; Silk Grass Creek, in cohune ridge, Mar. 29, 1954, *Gentle 8176* (LL), tree, 4 in. diam., flowers creamish colored, *"copal"*; Humming Bird Highway, in high ridge, Sept. 17, 1954, *Gentle 8387* (LL), tree, 7 in. diam., creamish colored flowers, *"copal"*; Silk Grass Creek area, in cohune ridge, Jan. 10, 1955, *Gentle 8534* (LL), tree, 4 in. diam., *"copal"*; Humming Bird Highway, Humming Bird Gap, in high ridge, July 30, 1955, *Gentle 8814* (LL), tree, 7 in. diam., flowers yellow, *"mountain copal"*; Toledo District, Swasey Branch, Monkey River, beyond falls, in high ridge, Mar. 16, 1942, *Gentle 3973* (LL), tree, 7 in. diam., *"copal"*; Monkey River, between Rancho Chico and Cockscomb, in wild coffee ridge, Mar. 23, 1943, *Gentle 4328* (LL), tree, 7 in. diam., *"copal"*; same locality and date, *Gentle 4329* (LL), tree, 8 in. diam., *"copal"*; Rio Grande, on riverbank, in high ridge, Oct. 16, 1944, *Gentle 4885* (LL), tree, 6 in. diam., flowers creamish colored, *"copal"*; Temash River, upper reach, in broken ridge, Feb. 1945, *Gentle 5200* (LL), tree, 7 in. diam., flowers creamish colored, *"copal"*; near San Antonio, in high ridge, Jan. 9, 1946, *Gentle 5481* (LL), tree, 10 in. diam., flowers yellow, scented, *"copal"*; between Condemn Branch Pine Ridge and Moffredye Lagoon, in cohune ridge, Aug. 23, 1946, *Gentle 6035* (LL), tree, 6 in. diam., flowers creamish colored, *"high ridge copal"*.

A single collection of *P. Schippii* has been reported from Yucatan by Swart (l.c., p. 365), otherwise the species has been found only in southern British Honduras.

TETRAGASTRIS PANAMENSIS (Engl.) Kuntze, Rev. Gen. 1: 107. 1891; Swart, Rec. Trav. Bot. Neerland. 39: 416. 1942.

Tetragastris Stevensonii Standl., Field Mus. Bot. 4: 216. 1929.

BRITISH HONDURAS: Toledo District, Monkey River, Swasey Branch, in high ridge, March 8, 1942, *Percy H. Gentle 3952* (LL), tree, 12 in. diam., *"mountain copal"*; Stann Creek District, Eve's Pine Ridge Road, in broken ridge, Dec. 8, 1953, *Gentle 8085* (LL), tree, 8 in. diam., *"copal"*.

ANACARDIACEAE

Metopium Gentlei Lundell, sp. nov.

Arbor, ramuli parce strigillosi; folia 5-foliolata; foliola subcoriacea, lanceolato-elliptica vel elliptica, 5–13.5 cm. longa, 2–7 cm. lata; foliola lateralia sessilia vel subsessilia, apice breviter acuminata vel obtusa vel emarginata, basi acutiuscula vel rotundata; inflorescentia ad 22 cm. longa, paniculata, congesta; calycis lobis imbricatis; fructus oblongus, 1–1.2 cm. longus.

A tree, often large, with rather slender twigs at first minutely and rather sparsely strigillose, the buds densely strigillose. Leaves 5-foliolate, the rachis 10 to 18 cm. long, rather slender; the leaflets subcoriaceous, lanceolate-elliptic or elliptic, 5 to 13.5 cm. long, 2 to 7 cm. wide, the apical leaflet acutish to rounded at base, the paired leaflets strongly unequal, the lower side decurrent on petiolule, apex short acuminate, obtuse and sometimes emarginate, midvein conspicuous, elevated beneath, the primary veins 8 to 10 on each side, evident on both surfaces, the blades very sparsely

strigillose on undersurface, the terminal leaflet with long slender petiolule, the upper pair of leaflets sessile, the lower side decurrent to the rachis, the basal pair of leaflets subsessile or sometimes with short petiolules up to 7 mm. long, usually decurrent to rachis. Flowers borne in long slender congested axillary panicles up to 22 cm. long, the branches of panicle very short, less than 2.5 cm. long, the bracts and bractlets strigillose. Calyx lobes imbricate, rounded, ciliolate, the calyx narrowed below into a thick stipe about 1 mm. long. Petals lanceolate, 3.5 to 4 mm. long. Anthers oblong, about twice the length of filaments. Fruits oblong, 1 to 1.2 cm. long, shining.

GUATEMALA: Department of Peten, La Libertad, Sabana San Francisco, April 4, 1933, *C. L. Lundell 2459* (type, LL), a tree, "*chechem negra*". BRITISH HONDURAS: El Cayo District, Vaca, on hillside, May 13, 1938, *Percy H. Gentle 2617* (LL), tree, 5 in. diam., "*black poison wood*"; Stann Creek District, Humming Bird Gap, Humming Bird Highway, in high ridge, base of hill, Aug. 15, 1956, *Gentle 9210* (LL), large tree.

The presence of a second species of *Metopium* on the Yucatan Peninsula is remarkable, and the fact that it has remained unrecognized is even more so. *M. Gentlei*, its congested inflorescences with branches not over 2.5 cm. long, and its upper pair of leaflets sessile can be readily distinguished from the closely related, *M. Brownei* (Jacq.) Urban, which abounds in the same area. In the latter, the inflorescences are laxly paniculate, and all the leaflets are borne on long slender petiolules. In *M. Gentlei* the stipe of the flowers is scarcely 1 mm. long, whereas it is slenderer and up to 2 mm. long in *M. Brownei*. *M. venusum* (Griseb.) Engler and *M. toxiferum* (L.) Krug & Urb. of the West Indies both have stamens with filaments longer than the anthers, and differ otherwise from *M. Gentlei* in various characteristics.

CELASTRACEAE

With rejection of the proposal for conservation of *Rhacoma* L. (1759), the genus *Crossopetalum* P. Br. (1756) is retained for the species usually referred by recent authors to *Rhacoma* L. and *Myginda* Jacq. (see Taxon 8: 25. 1959; also, 10: 124. 1961).

For the species of Mexico and Central America, not transferred heretofore to *Crossopetalum*, the following new combinations are necessary.

Crossopetalum eucymosum (Loes. & Pitt.) Lundell, comb. nov.

Myginda eucymosa Loes. & Pitt., Contr. U. S. Nat. Herb. 12: 175. *pl. 18*. 1909.
Rhacoma eucymosa (Loes. & Pitt.) Standl., Carnegie Inst. Publ. 461: 69. 1935.

Crossopetalum filipes (Sprague) Lundell, comb. nov.

Microtropis filipes Sprague, Kew Bull. p. 363. 1909.
Myginda filipes (Sprague) Loes., Notizbl. Bot. Gart. Berlin 13: 226. 1936.

Crossopetalum Gaumeri (Loes.) Lundell, comb. nov.

Myginda Gaumeri Loes., Field Mus. Bot. 1: 401. 1898.
Rhacoma Gaumeri (Loes.) Standl., Field Mus. Bot. 12: 229. 1936.

Crossopetalum Gentlei (Lundell) Lundell, comb. nov.

Rhacoma Gentlei Lundell, Carnegie Inst. Publ. 478: 212. 1937.
Myginda Gentlei (Lundell) Lundell, Bull. Torrey Club 64: 553. 1937.

Crossopetalum macrocarpum (T. S. Brandeg.) Lundell, comb. nov.

Myginda macrocarpa T. S. Brandeg., Univ. Calif. Publ. Bot. 6: 56. 1914.
Rhacoma macrocarpa (T. S. Brandeg.) Standl., Contr. U. S. Nat. Herb. 23: 681. 1923.

Crossopetalum Managuatillo (Loes.) Lundell, comb. nov.

Rhacoma Managuatillo Loes., Repert. Sp. Nov. 8: 294. 1910.

Crossopetalum oxyphyllum (Blake) Lundell, comb. nov.

Myginda oxyphylla Blake, Contr. Gray Herb. n. ser. 53: 60. 1918.
Rhacoma oxyphylla (Blake) Standl., Contr. U. S. Nat. Herb. 23: 681. 1923.

Crossopetalum parviflorum (Hemsl.) Lundell, comb. nov.

~*Euonymus parviflorus* Hemsl., Diag. Pl. Mex. p. 6. 1878.
~*Microtropis parviflora* (Hemsl.) Sprague, Kew Bull. p. 363. 1909.
~*Myginda parviflora* (Hemsl.) Loes., Natizbl. Bot. Gart. Berlin 13: 225. 1936.
~*Rhacoma parviflora* (Hemsl.) Lundell, Am. Midl. Nat. 20: 238. 1938.
Rhacoma lanceifolia Lundell, Field Lab. 13: 6. 1945.

NICARAGUA: Chontales, 1867–68, *R. Tate 292* (type, K; photograph, LL). GUATEMALA: Department of Peten, Dolores, between kms. 85/86, west of Machaquila Road, Sept. 20, 1961, *Elias Contreras 2933* (LL), tree, 4 in. diam., 25 ft. high, fruit red; Dolores, between kms. 86/87, east of Machaquila Road, in high forest, Sept. 25, 1961, *Contreras 2962* (LL), tree, 5 in. diam., 30 ft. high, fruit red; Department of Alta Verapaz, between Campur and Socoyo, Apr. 9, 1941, *Paul C. Standley 91725* (LL); along Rio Icvolay, 8–10 miles nw. of Cubilguitz, alt. 200–210 m., Mar. 14, 1942, *Julian A. Steyermark 45083* (LL), tree, 25 ft., flowers greenish-cream, "*tzol-kuk*". BRITISH HONDURAS: Toledo District, between Rancho Chico and Cockscomb, Monkey River, in forest on hillside, Mar. 22, 1943, *Percy H. Gentle 4320* (type of *R. lanceifolia*, LL), tree, 4 in. diam., fls. white, "*uvito*".

C. parviflorum, the type of which I have studied, is closely related to *C. eucymosum* (Loes. & Pitt.) Lundell. The latter has finer pubescence, subterete twigs, and conspicuously larger much-branched cymes with longer pedicels.

The drupaceous fruits of *C. parviflorum* are asymmetrically obovoid, up to 1.6 cm. long, borne on pedicels up to 3 mm. long.

Crossopetalum puberulum (Lundell) Lundell, comb. nov.

Rhacoma riparia Lundell var. *puberula* Lundell, Carnegie Inst. Publ. 478. 213. 1937.
Myginda puberula (Lundell) Lundell, Bull. Torrey Club 64: 553. 1937.
Rhacoma puberula (Lundell) Standl. & Steyerm., Field Mus. Bot. 23: 60. 1944.

Crossopetalum riparium (Lundell) Lundell, comb. nov.

Rhacoma riparia Lundell, Carnegie Inst. Publ. 478. 213. 1937.
Myginda riparia (Lundell) Lundell, Bull. Torrey Club 64: 553. 1937.

Crossopetalum Standleyi (Lundell) Lundell, comb. nov.

Myginda Standleyi Lundell, Bull. Torrey Club. 67: 618. 1940.
Rhacoma Standleyi (Lundell) Standl. & Steyerm., Field Mus. Bot. 23: 60. 1944.

Crossopetalum Tonduzii (Loes.) Lundell, comb. nov.

Gyminda Tonduzii Loes., Bot. Jahrb. 29: 98. 1900.
Gyminda costaricensis Standl., Field Mus. Bot. 18: 632. 1937.
Rhacoma Tonduzii (Loes.) Standl. & Steyerm., Field Mus. Bot. 23: 60. 1944.

SAPINDACEAE

Blomia prisca (Standl.) Lundell, comb. nov.

Cupania prisca Standl., Carnegie Inst. Publ. 461: 69. 1935.

Tikalia Lundell (Wrightia 2: 119. 1961) appears to be the same as *Blomia* Miranda, described from Chiapas (Anal. Inst. Biol. Mexico 24: 82. 1953). An attempt will be made again in 1962 to collect pistillate material and additional fruiting specimens of *Tikalia* in order to clarify the status of the genus.

CUPANIA SPECTABILIS Radlk., Sitzb. Math.-Phys. Acad. Muench. 9: 559. 1879.

Cupania Schippii Standl., Field Mus. Bot. 12: 411. 1936.

BRITISH HONDURAS: Belize District, Single Hill Creek, Manatee River, Feb. 1, 1931, *H. H. Bartlett 11324* (LL); Belize-El Cayo Road, Colonel English Pine Ridge, in wooded island, April 22, 1958, *Percy H. Gentle 9730* (LL), tree, 3 in. diam., *"Grande Betty"*; Toledo District, Swasey Branch, Monkey River, in high ridge, Mar. 11, 1942, *Gentle 3960* (LL), tree, 6 in. diam., *"mountain Grande Betty"*; Bolo Camp, upper reach, Golden Stream, in high ridge, Apr. 28, 1944, *Gentle 4563* (LL), tree, 5 in. diam., *"Grande Betty"*.

I have not seen specimens of *C. spectabilis* cited by Radlkofer from Mexico, but from description *C. Schippii* appears to be synonymous. In our material from British Honduras, the sepals are 2.5 to 3 mm. long,

rather than 2 mm. described in *C. spectabilis*, but this difference does not appear significant. Standley and Steyermark (Fieldiana Bot. 24: 246. 1949) noted the relationship between the two species, but considered *C. Schippii* distinct.

MYRTACEAE

Eugenia amatenangensis Lundell, sp. nov.

Arbor parva, ramulis novellis sericeis; folia petiolata, petiolo ad 7 mm. longo; lamina glabra, chartacea vel subcoriacea, elliptico-oblonga vel oblanceolato-oblonga, 5–7.5 cm. longa, 2.3–3.3 cm. lata, apice obtusa vel obtuse subacuminata, basi acuta; inflorescentia abbreviata, racemosa; pedicelli fructiferi ad 1 mm. longi; bracteola ovato-rotundata, ca. 1.2 mm. longa, apiculata, connata; sepala 4, sericea, late ovata, ca. 1.2 mm. longa; stylus ca. 5 mm. longus; bacca oblonga, 9–12 mm. longa, parce sericea.

Small tree, twigs sparsely sericeous, glabrescent early, rather short and nodose. Leaves drying dark brown, petiolate, the petioles sparsely sericeous at first, up to 7 mm. long, canaliculate; leaf blades glabrous, chartaceous or subcoriaceous, shining above, dull and paler beneath, elliptic-oblong or oblanceolate-oblong, 5 to 7.5 cm. long, 2.3 to 3.3 cm. wide, apex obtuse or obtusely subacuminate, base acute, midvein impressed above, elevated beneath, primary veins slender, 6 to 8 on each side. Flowers subsessile, borne in abbreviated congested axillary racemes, the rachis less than 3 mm. long. Pedicels less than 1 mm. long. Bracteoles conspicuous, ovate-rounded, apiculate, about 1.2 mm. long, sericeous, connate at base, glandular. Ovary and calyx sericeous. Sepals 4, subequal, broadly ovate, about 1.2 mm. long. Petals about 3 mm. long. Style about 5 mm. long. Fruits oblong, 9 to 12 mm. long, sparsely sericeous. Embryo homogeneous.

MEXICO: Chiapas, Amatenango del Valle, alt. 1835 m., riverside, June 12, 1945, *Eizi Matuda 5832* (type, LL), a small tree 3 m. high, flowers red.

A species of uncertain relationship, *E. amatenangensis* is noteworthy for the short congested axis of its inflorescence, relatively large thin bracteoles connate at base, and oblong-ellipsoid subsessile fruits. Only dried loose flowers persisting at the base of the fruits are available, and the description of the flowers is based on this unsatisfactory material. The sparse persistent sericeous indument on petioles and twigs indicates that new growth and young leaves are sericeous.

Eugenia argyrea Lundell, sp. nov.

Arbor parva, sericea; folia novella sericea, petiolata, petiolo 4–7 mm. longo; lamina chartacea, lanceolata vel elliptico-lanceolata, 7–10.5 cm.

longa, 2.5–4.3 cm. lata, apice acuminata, basi acuta; inflorescentia sericea, subcorymbosa vel racemosa; pedicelli 1–3 mm. longi; bracteola rotundata, ad 0.7 mm. longa, connata; sepala sericea, ovato-rotundata, 1–1.4 mm. longa; petala obovata, 2.5 mm. longa, ciliolata; stylus 5 mm. longus, pilosus.

Small tree, 2 to 3 m. high, all parts sericeous at first with silvery or reddish-tinged hairs, the twigs slender. Leaves densely sericeous, glabrescent early, petiolate, the petioles slender, canaliculate, 4 to 7 mm. long, reddish; leaf blades paler beneath, chartaceous, lanceolate or elliptic-lanceolate, 7 to 10.5 cm. long, 2.5 to 4.3 cm. wide, apex long acuminate, the acumen obtusish, base acute, midvein impressed above, prominent beneath, the lateral veins inconspicuous on both surfaces, 7 to 9 on each side. Inflorescence sericeous, subcorymbose or racemiform, the rachis 1 to 6 mm. long, with conspicuous ovate bracts. Pedicels 1 to 3 mm. long. Bracteoles rounded, up to 0.7 mm. long, connate at base. Ovary sericeous. Sepals sericeous, unequal, ovate-rounded, the smaller pair scarcely 1 mm. long, the larger pair about 1.4 mm. long. Petals obovate, 2.5 mm. long, ciliolate. Receptacle pubescent. Style 5 mm. long, pilose below middle.

MEXICO: Chiapas, Cascada, near Siltepec, in woods, alt. 1600 m., Feb. 27, 1945, *Eizi Matuda 5074* (type, LL), a small tree 2–3 m. high, flowers white.

E. argyrea has affinity to *E. guatemalensis* Donn. Smith, a species to be distinguished readily by its larger flowers, minute subulate bracteoles, and glabrous disk.

Eugenia calciphila Lundell, sp. nov.

Arbor parva, ramulis glabris; folia glabra, petiolata, petiolo 4–6 mm. longo; lamina chartacea, elliptica vel ovato-elliptica, 3.5–6.5 cm. longa, 1.7–3.7 cm. lata, apice obtuse acuminata vel obtusa, basi acuta; inflorescentia racemosa, parce sericea; pedicelli 1.5–3 mm. longi; bracteola ovata, ca. 0.7 mm. longa; sepala ovato-rotundata, 1.5–2 mm. longa, parce sericea; stylus ca. 6 mm. longus.

Tree, 7.5 cm. diam., 5 m. high, twigs slender, glabrous, reddish, the branches whitened. Leaves glabrous, slender petiolate, the petioles 4 to 6 mm. long, canaliculate; leaf blades chartaceous, bright green, slightly paler beneath, elliptic or ovate-elliptic, 3.5 to 6.5 cm. long, 1.7 to 3.7 cm. wide, apex narrowed to a short broad obtuse acumen or obtuse, base acute, the blade decurrent on the petiole, midvein impressed above, elevated beneath, the primary lateral veins slender, 6 to 8 on each side, rather obscure above, more conspicuous beneath, the secondary veins reticulate. Flowers in short axillary racemes, the inflorescence very sparsely

sericeous, the rachis 1 to 4 mm. long. Pedicels short, stout, 1.5 to 3 mm. long. Bracteoles ovate, about 0.7 mm. long, sericeous, persistent, not connate at base. Ovary sparsely sericeous. Sepals subequal, reflexed, ovate-rounded, 1.5 to 2 mm. long, sparsely sericeous. Petals about 3.5 mm. long. Style about 6 mm. long.

GUATEMALA: Department of Peten, Dos Lagunas, on Ixcanrio Road, about 4 km. ne.e. of the village, in *ramonal*, Oct. 21, 1960, *Elias Contreras 1541* (type, LL), tree, 3 in. diam., 15 ft. high.

E. calciphila so closely resembles *E. Lundellii* Standl., a common small tree of the *tintal* and other swampy habitats, that I referred the collection initially to that species. But the bright green thinner leaves with blades ovate-elliptic or elliptic and with a short wide obtuse acumen are different in aspect. The twigs are entirely glabrous, not puberulent as in *E. Lundellii*, and the inflorescence is only very sparsely sericeous. The flowers are slightly larger than in *E. Lundellii*, and borne on shorter pedicels.

E. calciphila is a small tree of the *ramonal*, the well drained upland forest usually covering sites of ancient ruins.

Eugenia crenularis Lundell, sp. nov.

Frutex, ramulis puberulis; folia petiolata, petiolo puberulo, 3–4 mm. longo; lamina crenulata, chartacea, oblonga vel lanceolato-oblonga, 4–7 cm. longa, 1.3–2.6 cm. lata, apice obtusa, basi acutiuscula; inflorescentia racemosa, puberula, ad 5 mm. longa; pedicelli 0.5–3 mm. longi; bracteola parva, libera; sepala imbricata, parva, late rotundata, 0.5–1 mm. longa, glabra; petala ca. 3 mm. longa; stylus ca. 5 mm. longus.

Shrub, 4 to 5 m. high, with slender short densely puberulent twigs. Leaves drying brown, short petiolate, the petioles puberulent, 3 to 4 mm. long, canaliculate; blades crenulate, chartaceous, puberulent along the midvein above, glabrescent, oblong or lanceolate-oblong, 4 to 7 cm. long, 1.3 to 2.6 cm. wide, apex obtuse, base acutish, midvein impressed above, elevated beneath, the primary lateral veins slender, 9 to 11 on each side. Flowers in short axillary racemes, the rachis puberulent, up to 5 mm. long, with a terminal flower. Pedicels minutely puberulent or glabrous, 0.5 to 3 mm. long. Bracteoles small, distinct, persistent. Ovary glabrous. Sepals imbricate, small, unequal, broadly rounded, 0.5 to 1 mm. long, glabrous. Petals suborbicular, about 3 mm. long. Style glabrous, about 5 mm. long.

MEXICO: Mexico, District of Temascaltepec, Temascaltepec, June 2, 1935, *Geo. B. Hinton 7695* (type, LL), shrub 4 m.; District of Temascaltepec, Nanchititla, by the water, April 14, 1933, *Hinton 3778* (LL), shrub 5 m. leaning on other plants.

The species is remarkable for its crenulate leaves.

Eugenia comitanensis Lundell, sp. nov.

Arbor parva, glabra; folia glabra, petiolata, petiolo 3–5 mm. longo; lamina crispata, chartacea vel subcoriacea, oblonga vel lanceolato-oblonga, 3–7.5 cm. longa, 1.3–3 cm. lata, apice obtusa, basi acutiuscula; inflorescentia parva, racemosa; pedicelli 1–3 mm. longi; bracteola connata, glabra; sepala rotundata, 0.6–1 mm. longa, ciliolata; petala obovato-elliptica, ca. 3 mm. longa, ciliata; stylus 5 mm. longus.

Small tree, twigs glabrous, rather short, rigid, whitened with age. Leaves glabrous, short petiolate, the petioles 3 to 5 mm. long, canaliculate; leaf blades crispate, drying blackish, chartaceous or subcoriaceous, oblong or lanceolate-oblong, 3 to 7.5 cm. long, 1.3 to 3 cm. wide, apex obtuse, base acutish, midvein impressed above, prominent beneath, the primary lateral veins slender, 9 to 11 on each side. Flowers in short axillary racemes, the rachis 1 to 7 mm. long, glabrous, the bracts puberulent. Pedicels 1 to 3 mm. long, rather stout, glabrous. Bracteoles connate at base, persistent. Ovary glabrous. Sepals unequal, rounded, 0.6 to 1 mm. long, ciliolate. Petals obovate-elliptic, about 3 mm. long, ciliate. Style glabrous, 5 mm. long.

MEXICO: Chiapas, Trapichito, near Comitan, alt. 1350 m., June 2, 1945, *Eizi Matuda 5753*[V](type, LL), small tree.

The leaf margin in *E. comitanensis* is crispate and obscurely crenulate, resembling that of *E. crenularis* Lundell. The two species are very close, and *E. comitanensis* may be a glabrous variety of *E. crenularis*.

Eugenia cozumelensis Lundell, sp. nov.

Arbor parva, ramulis rufo-puberulis; folia chartacea, petiolata, petiolo puberulo, 4–6 mm. longo; lamina glabra, lanceolata, 4–8 cm. longa, 1.5–3.2 cm. lata, apice obtuse acuminata, basi acutiuscula; inflorescentia puberula, racemosa; pedicelli crassi, 1–2.5 mm. longi; bracteola parva, connata; sepala parva, late ovata, 0.5–0.8 mm. longa, minute puberula; petala obovato-rotundata, 2.2–2.7 mm. longa; stylus ca. 3.5 mm. longus.

Small tree, young twigs drying black, becoming white with age, persistently puberulent with reddish hairs, the axillary buds strigose with red hairs. Leaves glabrous except for a few hairs along the midvein when young, drying blackish, paler beneath, petiolate, the petioles puberulent, 4 to 6 mm. long, black, canaliculate; leaf blades lanceolate, 4 to 8 cm. long, 1.5 to 3.2 cm. wide, apex acuminate, the acumen obtusish, base acutish, midvein slightly impressed above, elevated beneath, the lateral veins 8 or 9 on each side, inconspicuous. Inflorescence racemiform, densely puberulent with reddish hairs, the rachis of the congested racemes 1 to 4 mm. long. Pedicels rather stout, 1 to 2.5 mm. long, puberulent. Bracteoles rounded, about 0.3 mm. long, ciliolate, connate at base. Ovary minutely

puberulent. Sepals very small, unequal, broadly ovate, 0.5 to 0.8 mm. long, minutely puberulent. Petals obovate-rounded, 2.2 to 2.7 mm. long. Style slender, about 3.5 mm. long.

MEXICO: Quintana Roo, Cozumel Island, San Miguel, in forest, Aug. 6–8, 1932, *W. C. Steere 2640* (type, LL).

Among the species of the Yucatan Peninsula, *E. cozumelensis* appears to have closest affinity to *E. itzana* Lundell, which has glabrous twigs and obtuse leaves. The leaves of *E. cozumelensis* blacken when dried.

Eugenia flavida Lundell, sp. nov.

Arbor, 10-metralis; folia novella sericea, petiolata, petiolo 5–7 mm. longo; lamina subcoriacea, flavida, oblongo-elliptica vel lanceolata, 4–7 cm. longa, 1.8–3.3 cm. lata, apice obtuse acuminata, basi acutiuscula; inflorescentia racemosa; pedicelli fructiferi ad 2.5 mm. longi; bracteola ca. 1 mm. longa; sepala ovato-rotundata, 1–1.5 mm. longa; bacca globosa, 8–9 mm. diam.

Tree, 10 cm. diam., 10 m. high, mature twigs slender, rather short, glabrescent. Leaves sericeous at first on undersurface, glabrescent, petiolate, the petioles drying orange-yellow, canaliculate, 5 to 7 mm. long; leaf blades subcoriaceous, drying yellowish, oblong-elliptic or lanceolate, 4 to 7 cm. long, 1.8 to 3.3 cm. wide, apex obtusely acuminate, base acutish, midvein slightly impressed above, elevated beneath, the primary veins slender, 9 to 13 on each side, inconspicuous on both surfaces. Flowers in very short axillary racemes, the fruiting pedicels up to 2.5 mm. long. Bracteoles persistent on fruiting pedicels about 1 mm. long. Fruits yellow-green, 1- or 2-seeded, globose, or oblong (2-seeded), when dry 8 to 9 mm. in diam., crowned by the persistent calyx, the sepals ovate-rounded, 1 to 1.5 mm. long. Embryo homogeneous.

GUATEMALA: Department of Peten, Dos Lagunas, in low secondary forest of airfield clearing, Dec. 15, 1960, *Elias Contreras 1693* (type, LL), tree, 4 in. diam., 30 ft. high, fruits yellow-green, "*guayabillo*".

No flowers have been seen, and only dried fruits past maturity are available. Two of the terminal leaves show remains of sericeous indument on undersurface.

Eugenia Hintonii Lundell, sp. nov.

Arbor parva, ramulis puberulis; folia parva, petiolata, petiolo puberulo, 3–5 mm. longo; lamina lanceolata, 3–4.5 cm. longa, 1–1.5 cm. lata, apice acuminata, basi acuta; inflorescentia racemosa, puberula; pedicelli fructiferi 1–2 mm. longi; bracteola ca. 0.4 mm. longa; bacca ellipsoidea, 8–10 mm. longa.

Tree, 6 m. high, twigs slender, short, puberulent, glabrescent. Leaves small, slender petiolate, the petioles puberulent, 3 to 5 mm. long; leaf blades with margin irregularly and inconspicuously crenulate, lanceolate, 3 to 4.5 cm. long, 1 to 1.5 cm. wide, apex acuminate, base acute, puberulent above along the impressed midvein, glabrous beneath, the midvein elevated beneath, the primary lateral veins slender. Inflorescence short racemose, puberulent, the rachis stout, up to 3 mm. long. Pedicels 1 to 2 mm. long. Bracteoles persistent, glandular, about 0.4 mm. long. Fruits (immature) ellipsoid, 8 to 10 mm. long, densely glandular, crowned by the persistent calyx, the sepals unequal, broadly rounded, 0.5 to 1.2 mm. long.

MEXICO: Guerrero, District of Mina, Manchon, in oak woods, Sept. 28, 1936, *Geo. B. Hinton 9603* (type, LL), tree, 6 m.

Among the species with small narrow acuminate leaves, *E. Hintonii* is distinctive in having ellipsoid fruits and leaf margins irregularly crenulate. It appears to have affinity to *E. crenularis* Lundell.

Eugenia letreroana Lundell, sp. nov.

Arbor parva, ramulis minute puberulis; folia petiolata, petiolo 4–6 mm. longo; lamina subcoriacea, glabra, lanceolata, 3–6 cm. longa, 1.1–1.8 cm. lata, apice obtuse acuminata, basi acuta; inflorescentia racemosa, minute puberula; pedicelli 1–2.5 mm. longi; bracteola parva; sepala late ovata, 0.6–1 mm. longa; petala ovato-rotundata.

Small tree, 3 to 4 m. high, the twigs minutely puberulent. Leaves strikingly paler on undersurface, petiolate, the petioles slender, 4 to 6 mm. long, minutely puberulent at first, canaliculate; leaf blades subcoriaceous, glabrous at maturity, lanceolate, 3 to 6 cm. long, 1.1 to 1.8 cm. wide, apex obtusely acuminate, base acute, midvein impressed above, elevated beneath, the primary veins scarcely discernible above, obscure beneath. Inflorescence racemose, minutely puberulent, the rachis 3 to 12 mm. long. Pedicels puberulent, short, 1 to 2.5 mm. long, the terminal flower subsessile. Bracteoles small, about 0.4 mm. long, ovate-triangular, distinct, persistent. Ovary minutely puberulent. Sepals sparsely puberulent, subequal, broadly ovate, 0.6 to 1 mm. long. Petals ovate-rounded.

MEXICO: Chiapas, Letrero, near Siltepec, alt. 2000 m., in virgin forest, July 6, 1941, *Eizi Matuda 4336* (type, LL), a small tree, 3–4 m. high, flowers white.

Among the species of the region with small narrow leaves, *E. letreroana* is noteworthy in having leaf blades much paler beneath and with obscure venation. From description, its affinity appears to be with *E. sasoana* Standl. & Steyerm. of Guatemala.

EUGENIA LINDENIANA Berg, Linnaea 20: 240. 1857.

MEXICO: Tabasco, Teapa, May, 1839, *J. Linden 619* (type photograph, LL); Boca del Cerro on the Usumacinta River, on limestone rock, July 1–5, 1939, *Eizi Matuda 3592* (LL), shrub, 2 m.

A century elapsed between the collections of Matuda and Linden, which indicates the desirability of describing a species even though known from a single specimen. Fruits, obtained by Matuda, are globose and up to 5 mm. in diameter. The embryo is homogeneous. In *Matuda 3592* the willow-like leaves are falcate, and somewhat longer than in *Linden 619*.

Eugenia michoacanensis Lundell, sp. nov.

Frutex vel arbor parva, 3-metralis; ramulis puberulis; folia chartacea, petiolata, petiolo 2.5–5 mm. longo, puberulo; lamina lanceolata vel elliptico-lanceolata, 3–7 cm. longa, 1.4–2.8 cm. lata, apice acuminata, basi acuta; inflorescentia racemosa, puberula; pedicelli 1–3.5 mm. longi; bracteola parva, connata; ovarium parvum, glabrum; sepala ovato-rotundata, 0.4–1 mm. longa, ciliata; petala ca. 2.2 mm. longa; stylus pilosus, ca. 3.5 mm. longus.

Shrub or tree, 3 m. high, twigs slender, puberulent. Leaves chartaceous, slender petiolate, the petioles 2.5 to 5 mm. long, canaliculate, puberulent; leaf blades lanceolate or elliptic-lanceolate, 3 to 7 cm. long, 1.4 to 2.8 cm. wide, apex acuminate, the acumen obtusish, base acute, puberulent above along the costa, midvein plane above, slightly elevated beneath, the primary lateral veins inconspicuous. Flowers in axillary racemes, the rachis puberulent and glandular, 3 to 8 mm. long, pubescence of the bracts reddish and coarser. Pedicels of flowers 1 to 2 mm. long, those of fruits up to 3.5 mm. long. Bracteoles small, connate at base. Ovary glabrous. Sepals ovate-rounded, unequal, 0.4 to 1 mm. long, ciliate. Petals elliptic, about 2.2 mm. long. Style sparsely pilose below, about 3.5 mm. long. Fruits 1-seeded, depressed globose, 6 to 8 mm. diam. Embryo homogeneous.

MEXICO: Michoacan, District of Coalcoman, San Pedro, alt. 600 m., in chaparral, June 19, 1939, *Geo. B. Hinton 13812* (type, LL), shrub 3 m. high, flowers white; District of Coalcoman, Huizontla, in woods, Dec. 12, 1941, *Hinton 16212* (LL), tree, 3 m.; District of Coalcoman, Aquila, Dec. 1941, *Hinton 16244* (LL).

The 1941 collections are in fruit.

Eugenia nigrita Lundell, sp. nov.

Arbor parva, ramulis novellis parce rufo-puberulis; folia membranacea, glabra, petiolata, petiolo 5–7 mm. longo; lamina membranacea, lanceolata vel lanceolato-elliptica, 4–6.5 cm. longa, 1.5–3 cm. lata, apice obtuse acuminata, basi acuta; inflorescentia racemosa, parva, parce puberula;

pedicelli 1–2 mm. longi; bracteola ca. 0.65 mm. longa, libera; sepala late ovata vel rotundata, 1–1.3 mm. longa, ciliata; petala late elliptica, rotundata, 3 mm. longa, ciliata; stylus 6 mm. longus, parce pilosus; bacca globosa, usque ad 1.5 cm. diam.

Small tree, twigs slender, new growth drying black, sparsely pubescent at first with short reddish appressed hairs, glabrescent early, the axillary buds pubescent with red hairs. Leaves drying brown to blackish, membranaceous, glabrous except for scattered short reddish hairs on petioles, the petioles slender, 5 to 7 mm. long, canaliculate; leaf blades lanceolate or lanceolate-elliptic, 4 to 6.5 cm. long, 1.5 to 3 cm. wide, apex obtusely acuminate, base acute, the midvein impressed above, elevated beneath, finely reticulate veined, the primary lateral veins 5 to 6 on each side. Flowers congested in the leaf axils, rachis of the racemes sparsely puberulent, usually less than 5 mm. long, sometimes up to 1 cm. long. Pedicels short, sparsely puberulent, glandular, 1 to 2 mm. long. Bracteoles triangular, about 0.65 mm. long, free, persistent. Ovary glabrescent. Sepals unequal, broadly ovate or rounded, the smaller pair about 1 mm. long, the larger about 1.3 mm. long, ciliate. Petals broadly elliptic, rounded, 3 mm. long, ciliate. Style 6 mm. long, sparsely pubescent, slightly longer than the stamens. Fruits globose, up to 1.5 cm. diam. Embryo homogeneous.

MEXICO: Chiapas, Cascada, near Siltepec, in woods, alt. 1600 m., Mar. 1, 1945, *Eizi Matuda 5183* (type, LL), a small tree 3 m. high; same locality, Feb. 27, 1945, *Matuda 5074* (LL), a small tree 2–3 m. high, flowers white; same locality, Mar. 3, 1945, *Matuda 5109* (LL), a tree 5 m. high; same locality, in advanced forest, Mar. 1, 1945, *Matuda 5147* (LL), a tree 10 m. high.

All of the specimens cited are remarkably uniform, and the material is complete with flowers and mature fruits.

Specimens of *E. nigrita*, as well as those of *E. cozumelensis* Lundell, both of which have leaves which blacken when dried, have been referred to *E. axillaris* (Sw.) Willd., a tree of the West Indies.

Eugenia ovandensis Lundell, sp. nov.

Arbor parva, ramulis minute puberulis; folia petiolata, petiolo puberulo, 4–5 mm. longo; lamina membranacea, lanceolato-elliptica vel oblanceolato-elliptica, 4–6 cm. longa, 1.6–2.6 cm. lata, apice obtuse subacuminata, basi acuta; inflorescentia puberula, umbellata; pedicelli 2.5–6 mm. longi; bracteola parva, connata; sepala puberula, late rotundata, 0.5–1 mm. longa, apice subtruncata; petala 2–2.5 mm. longa; stylus ca. 4.5 mm. longus.

Small tree, twigs slender, densely puberulent. Leaves slender petiolate, the petioles puberulent, 4 to 5 mm. long, canaliculate; leaf blades thin, membranaceous, drying dark brown, slightly paler beneath, lanceolate-

elliptic or oblanceolate-elliptic, 4 to 6 cm. long, 1.6 to 2.6 cm. wide, apex subabruptly short acuminate, the acumen obtuse, base acute, puberulent above along the impressed midvein, glabrescent, midvein elevated beneath, finely reticulate-veined on both surfaces. Inflorescence umbelliform, densely puberulent, the abbreviated rachis of the racemes up to 3 mm. long, some flowers solitary. Pedicels slender, 2.5 to 6 mm. long, puberulent. Bracteoles minute, puberulent, persistent, connate at base. Ovary puberulent. Sepals puberulent, unequal, broadly rounded, 0.5 to 1 mm. long, subtruncate, ciliolate. Petals ovate-orbicular, 2 to 2.5 mm. long, ciliolate. Style about 4.5 mm. long.

MEXICO: Chiapas, Mt. Ovando, April 9-12, 1937, *Eizi Matuda 1834* (type, LL), small tree.

The broad rounded sepals subtruncate at apex, slender pedicels of the umbelliform inflorescence, and thin small leaves drying black-brown are distinguishing characteristics of *E. ovandensis*. All parts are densely puberulent.

EUGENIA RIOGRANDIS Lundell, Field Lab. 13: 10. 1945.

MEXICO: Tabasco, La Palma, near Balancan, in secondary growth, June 1–6, 1939, *Eizi Matuda 3241* (LL), shrub. BRITISH HONDURAS: Toledo District, Rio Grande, in wild coffee ridge, July 15, 1944, *Percy H. Gentle 4711* (LL), tree, 10 in. diam., flowers white; same locality, in high ridge, Aug. 25, 1944, *Gentle 4784* (type, LL), tree, 10 in. diam.; beyond San Antonio, in acahual, Aug. 11, 1948, *Gentle 6588* (LL), tree, 3 in. diam.; Joe Taylor Creek, creekside, in broken ridge, Sept. 18, 1951, *Gentle 7443* (LL). tree, 2 in. diam.

The fruits (*Gentle 6588*) are globose or ellipsoid, 1- or 2-seeded, and 5 to 6.5 mm. in diameter (immature), with homogeneous embryo.

The collection from Tabasco is the first record for the species outside of southern British Honduras.

Eugenia rubella Lundell, sp. nov.

Arbor parva, ramulis hirsutis; folia pilosa, petiolata, petiolo 3–5 mm. longo; lamina membranacea, elliptica vel obovato-elliptica, 5–9 cm. longa, 3–4.3 cm. lata, apice obtusa vel obtuse subacuminata, basi acutiuscula; inflorescentia rubella, umbellata, hirsuta; pedicelli ad 4 mm. longi; bracteola reflexa; ovarium hirsutum; sepala ovata, ca. 1.5 mm. longa, hirtella et ciliata; petala glabra, ciliata.

A small tree, 5 cm. in diam., 3 m. high, the twigs slender, reddish-brown, densely hirsute. Leaves pilose, densely so on undersurface with long hairs, petiolate, the petioles hirsute, slender, 3 to 5 mm. long; leaf blades thin, slightly paler beneath, elliptic or obovate-elliptic, 5 to 9 cm. long, 3 to 4.3 cm. wide, apex obtuse or obtusely short acuminate, base acutish,

midvein elevated beneath, the primary veins slender, 7 or 8 on each side, inconspicuous. Inflorescence umbelliform, reddish, densely hirsute, the rachis of the racemes abbreviated, about 2 mm. long. Pedicels slender, up to 4 mm. long, hirsute. Bracteoles distinct, reflexed. Ovary hirsute. Sepals (in bud) ovate with rounded apex, about 1.5 mm. long, hirtellous and ciliate. Petals (in bud) glabrous, ciliate.

GUATEMALA: Department of Peten, Dolores, about 2 km. se. of the village, on Rio Mopan trail, in high forest, June 29, 1961, *Elias Contreras 2559* (type, LL), small tree, 2 in. diam., 10 ft. high.

Closely resembling *E. origanoides* Berg in pubescence and leaf form, *E. rubella* may be recognized at once by its pedicellate flowers. Also, its leaves are somewhat thinner and more oval than in *E. origanoides* Berg and there are fewer primary veins. The material at hand, consisting of a single specimen with flower buds, is very inadequate.

From description, *E. chinajensis* Standl. & Steyerm. appears to be very close to *E. origanoides*. In the large series of specimens available from Peten and Belice, which I refer to *E. origanoides* and *E. chinajensis*, the differences between these two sessile flowered species are minor.

Eugenia tenuissima Lundell, sp. nov.

Frutex, ramulis minute puberulis; folia chartacea, petiolata, petiolo 3–4 mm. longo; lamina lineari-lanceolata, 3–5 cm. longa, 0.6–1.1 cm. lata, apice attenuata, obtusa vel rotundata, basi cuneata; inflorescentia umbellata, minute puberula; pedicelli fructiferi minute puberuli, 3–5 mm. longi; bacca globosa, ca. 4 mm. diam.

Shrub, twigs very slender, minutely puberulent. Leaves chartaceous, paler beneath, petiolate, the petioles slender, 3 to 4 mm. long, obscurely puberulent, reddish; leaf blades linear-lanceolate, 3 to 5 cm. long, 0.6 to 1.1 cm. wide, apex attenuate, obtuse or rounded, base cuneate, puberulent above along midvein, otherwise glabrous, sub-trinerved at base, the costa slightly impressed above, elevated beneath, the lateral veins slender but conspicuous. Inflorescence umbelliform, the rachis of the racemes abbreviated, up to 2 mm. long, puberulent. Pedicels obscurely puberulent, glabrescent early, slender, 3 to 5 mm long. Bracteoles minute, connate at base. Fruits globose, about 4 mm. in diam. (immature), crowned by 4 minute ovate or triangular subequal sepals 0.25 to 0.4 mm. long, ciliolate. Embryo homogeneous.

MEXICO: Oaxaca, District of Tuxtepec, Chiltepec and vicinity, alt. about 20 m., in *llanos*, 1940–1941, *G. Martinez-Calderon 546* (type, LL), shrub.

E. tenuissima Lundell is very close to *E. Lindeniana* Berg. They apparently differ primarily in leaf form. The leaves of *E. tenuissima*,

although linear-lanceolate and attenuate to the apex, have a very obtuse or rounded apex. *E. Lindeniana*, represented by *Matuda 3592* (LL) from Tabasco, has narrower, longer, falcate leaves tapering into a long slender acumen.

Eugenia uliginosa Lundell, sp. nov.

Arbor parva, glabra; folia flavida, petiolata, petiolo 6–9 mm. longo; lamina coriacea, lanceolato-elliptica vel lanceolato-oblonga, 9–10 cm. longa, 3.8–4.2 cm. lata, apice obtusa vel obtuse subacuminata, basi acuta; pedicelli fructiferi 3–4 mm. longi; bacca globosa, ad 1.8 cm. diam., basi stipitata; sepala ovata, ca. 2.3 mm. longa.

Small tree, 3 to 4 m. high, dichotomously branching; mature twigs subterete, flattened at the nodes, glabrous. Leaves glabrous, drying yellowish, paler beneath, petiolate, the petioles 6 to 9 mm. long, canaliculate; leaf blades decurrent on petioles, coriaceous, lanceolate-elliptic or lanceolate-oblong, 9 to 10 cm. long, 3.8 to 4.2 cm. wide, apex obtuse or with a wide short obtuse acumen, base acute, midvein nearly plane above, elevated slightly beneath, the primary veins slender, 13 to 15 on each side, inconspicuous. Flowers borne on old wood, evidently in very short racemes with rachis about 2 mm. long. Fruiting pedicels thick, 3 to 4 mm. long, the small indurated bracteoles persistent. Fruits globose, 1-seeded, up to 1.8 cm. in diameter, narrowed abruptly at base into a conical stipe 3 to 4 mm. long, crowned by ovate indurated sepals about 2.3 mm. long. Embryo homogeneous.

MEXICO: Chiapas, La Grandeza, alt. 2016 m., riverside, May 19, 1945, *Eizi Matuda 5546* (type, LL), a small tree 3–4 m. high.

The species is remarkable for its large stipitate fruits.

EUGENIA YAUTEPECANA Lundell, Wrightia 2: 107. 1960.

MEXICO: Mexico, District of Temascaltepec, Acatitlan, December 27, 1934, *Geo. B. Hinton 7172* (LL).

Described from Morelos, this additional record extends the range of the species considerably. *E. yautepecana* is an intricately branched shrub with oblong-ellipsoid fruits up to 1.7 cm. long. Its embryo is homogeneous.

VOLUME 3 MAY, 1962 NUMBER 2

WRIGHTIA

A BOTANICAL JOURNAL

CONTENTS

Plantae Mayanae—V. Petenaea cordata, a New Genus and Species in the Elaeocarpaceae, and Other Taxonomic Notes.
By Cyrus Longworth Lundell 21

Wood Anatomy of Petenaea cordata Lundell (Elaeocarpaceae).
By B. Francis Kukachka 36

MISSOURI BOTANICAL GARDEN LIBRARY
RECEIVED
JUN 18 1962

PUBLISHED BY
TEXAS RESEARCH FOUNDATION
RENNER, TEXAS

WRIGHTIA

WRIGHTIA, a botanical journal, is a publication of Texas Research Foundation. The contributions are by staff members and collaborators.

Each volume will contain a series of numbers, to be issued at irregular intervals. The subscription price for Volume 3 is $12.00, postpaid.

VOLUME 3, NUMBER 2
ISSUED MAY 15, 1962

Printed in the U.S.A.
Etheridge Printing Company
Dallas, Texas

WRIGHTIA

VOLUME 3 MAY, 1962 NUMBER 2

PLANTAE MAYANAE—V

PETENAEA CORDATA, A NEW GENUS AND SPECIES IN THE ELAEOCARPACEAE, AND OTHER TAXONOMIC NOTES

CYRUS LONGWORTH LUNDELL

The discontinuous distribution of many species of the Yucatan Peninsula can be related in part to the physiography, in part to the influence of man on the vegetation, but climatic changes must be considered. Over the past two or three thousand years, the limestone uplands have been periodically denuded through the local system of shifting agriculture, the *milpa*. Only in swamps, on steep slopes and hilltops, and along inaccessible cliffs can we find areas which support what appear to be relicts of undisturbed forest.

In Peten these relict areas are significant for here we find a number of species which characterize the dry deciduous forest of the arid northern tip of the Yucatan Peninsula. Their presence in Peten indicates the possibility that in past geological times the highly endemic flora of the State of Yucatan was much more widespread in its distribution.

In January, 1962 during the exploration of the gypsum escarpment along the north shore of Lake Peten Itza, between the villages of San Jose and Remate, a relict area of undisturbed forest was discovered. Apparently it had escaped the fires from nearby *milpas*, and the steep cliffs and slopes of the escarpment made undesirable the clearing of the land for agricultural purposes. Here along the lake shore I collected the type of *Petenaea cordata* Lundell.

In this area of old forest (*zapotal*), *Gymnopodium floribundum* Rolfe, *Neomillspaughia emarginata* (Gross) Blake, *Diospyros anisandra* Blake and other endemic woody and herbaceous species of Yucatan were common.

For his collaboration, I am deeply indebted to Dr. B. Francis Kukachka of the Forest Products Laboratory. His study of the wood anatomy of *Petenaea cordata* clarified relationships (Wrightia 3:36. 1962). Likewise for his assistance, my gratitude is expressed to Dr. Lyman B. Smith of the Smithsonian Institution.

For support of the 1961 and 1962 field work in Peten, acknowledgment

is made to the American Philosophical Society for grants from its Penrose Fund and its Michaux Fund.

NYCTAGINACEAE

Guapira linearibracteata (Heimerl) Lundell, comb. nov.

Pisonia linearibracteata Heimerl, Repert. Sp. Nov. 12: 221. 1913.

Guapira petenensis (Lundell) Lundell, comb. nov.

Torrubia petenensis Lundell, Carnegie Inst. Publ. 478: 208. 1937.

In making these transfers, I am following Woodson and Schery (Ann. Mo. Bot. Gard. 48: 61. 1961) in accepting Aublet's genus.

ELAEOCARPACEAE

Petenaea Lundell, gen. nov.

Frutex vel arbor; folia alterna, longe petiolata, simplicia, minute denticulata; inflorescentiae cymosae, ad apices ramorum axillares; flores hermaphroditi; sepala 4 vel 5, valvata, libera, reflexa, basi glandulosa et villosa; petala nulla; discus annuliformis, glaber; stamina 8–12, libera, omnia fertilia; antherae magnae, introrsae, apice dehiscentes; ovarium 4- vel 5-loculare, in stylum satis longum sensim angustatum; stigma integra, parva; ovulum in loculis numerosum; placentae axillares; fructus baccatus; semina minuta, numerosa.

The flowers of the genus *Petenaea* are distinctive. Notable is the presence of a fleshy annular disk. The free stamens, varying in number from 8 to 12, are borne on the inner edge of this disk, which surrounds the base of the ovary. The flower, although apetalous, is very attractive. The valvate sepals, strongly reflexed, bear 2 or 3 subsessile glands at the base of each. These are obscured by a conspicuous band of long villous rose-pink hairs which give the fresh flowers a velvety appearance. Above this ring of hairs, the yellow anthers stand erect in a close circle around the slender style.

The genus *Petenaea* has ovoid or subglobose baccate fruits, maroon-black when ripe and shallowly 4- or 5-lobed. These are sweet in flavor, resembling those of the *capulin*, *Muntingia Calabura* L., and contain numerous small seed. *Dicraspidia* is the only other genus of the family in Central America with baccate fruits.

Fig. 1. *Petenaea cordata* Lundell, type specimen, *C. L. Lundell 17279* (LL), × ½.

Dr. B. Francis Kukachka, from his study of the wood anatomy of *Petenaea cordata*, concludes that the genus is a natural member of the Elaeocarpaceae but exceptional in that all of the fibers are septate and the septa are very prominent. Further, Dr. Kukachka states:[1] "*Muntingia*

[1] In a private communication.

together with *Dicraspidia* anatomically are rather unique in the Elaeocarpaceae and differ quite markedly from the other genera including those of the Tiliaceae. Anatomically they would appear to be more closely allied to the African genera *Mansonia*, *Cistanthera*, and *Triplochiton* of the Sterculiaceae".

Petenaea cordata Lundell, sp. nov. Fig. 1.

Frutex vel arbor parva, ramulis villoso-tomentosis; folia petiolata, petiolo villoso, 5–11 cm. longo; lamina chartacea, minute denticulata, late cordata, 8.5–15.5 cm. longa, 6.5–14.5 cm. lata, apice subacuminata, supra parce villosa, subtus dense villosa et reticulato-venosa, palmatinervia; inflorescentia multiflora, rosea, cymosa, longi-pedunculata, usque ad 6 cm. longa, villoso-tomentosa; pedicelli 5–12 mm. longi; sepala 4 vel 5, valvata, reflexa, lanceolata, ca. 4 mm. longa, basi 2- vel 3-glandulosa et villosa; petala nulla; stamina 8–12, libera; filamenta 1.5–2 mm. longa, glabra; antherae lanceolato-oblongae, ca. 1.5 mm. longae; ovarium 4- vel 5-loculare, tomentosum; bacca ovata vel subglobosa, 4- vel 5-lobata, 6–12 mm. diam.; semina minuta, numerosa.

Tree, up to 12.5 cm. diam., 10 m. high, or sometimes a shrub, with indumentum of mostly short shaggy hairs; twigs rather thick, villous-tomentose. Leaves alternate, usually minutely stipulate, long petiolate, the petioles densely short villous, 5 to 11 cm. long; leaf blades minutely denticulate, firmly chartaceous, paler and densely short villous on undersurface, dark green and with sparser indumentum on upper surface, broadly cordate, 8.5 to 15.5 cm. long, 6.5 to 14.5 cm. wide, the basal sinus narrow, apex acute or broadly short acuminate, palmately veined at base, with only 2 or 3 primary veins on each side above base, conspicuously reticulate veined on undersurface, turning red with age. Inflorescence rose-pink, axillary, cymose, up to 6 cm. long, 6 cm. wide, long pedunculate, the branches slender, villous-tomentose; pedicels of flowers slender, 5 to 12 mm. long, jointed 1.5 to 4 mm. below calyx. Flower buds slender, lanceolate-attenuate, up to 4 mm. long, angled slightly along adnate edges of valvate sepals, densely short villous. Flowers rose-pink, perfect. Sepals 4, sometimes 5, valvate, about 4 mm. long at anthesis, lanceolate, attenuate from base to apex, reflexed, the base bearing 2 or 3 small obovoid subsessile glands and densely villous with long reddish hairs up to 2 mm. long. Apetalous. Disk annular, glandular. Stamens 8 to 12, free, all fertile; filaments borne on inner edge of disk, 1.5 to 2 mm. long, glabrous. Anthers yellow, 2-celled, introrse, lanceolate-oblong, about 1.5 mm. long, erect but

versatile, attached to filament about third of length above base, opening by apical pore-like slit. Ovary superior, sessile, surrounded at base by glandular disk, 4- or 5-celled, tomentose. Style slender, tapering above, pubescent at base, glabrous above, 3 to 3.4 mm. long, the stigmatic apex small and entire, subdiscoid. Ovules numerous, on axile placentas. Fruit baccate, ovoid or subglobose, shallowly 4- or 5-lobed, 6 to 12 mm. long, maroon-black when ripe, pulpy, sweet, crowned by the persistent style, sparsely pubescent. Seeds numerous, very small, 1 to 1.2 mm. long, oblong, pyramidal, or irregularly shaped, angled and transversely rugulose, drying brown. Endosperm copious. Embryo small, straight.

GUATEMALA: Department of Peten, Lake Peten Itza, gypsum escarpment along north shore, between San Jose and Remate, in *zapotal* bordering lake, January 23, 1962, *C. L. Lundell 17279* (type, LL), small tree or arborescent shrub, 15 ft. high, 3 in. diam., overhanging lake; inflorescence and flowers rose-pink, anthers yellow; ripe fruits ovoid or subglobose, shallowly 4- or 5-lobed, maroon-black, pulpy, sweet; same locality and date, *Lundell 17271* (LL).

Not more than twenty five plants of *P. cordata* were found. The species appears to be a relict adapted to a shore line habitat, for it was not noted on the steep forested hills which form the massive gypsum escarpment rising above the lake.

P. cordata flowers and fruits continuously. It was most attractive in January when the older leaves were turning red. The dense crown, up to fifteen feet high and equally as broad, was covered to the water line with the colorful leaves.

MYRSINACEAE

Ardisia angustialata Lundell, sp. nov.

Arbor parva, ramuli crassi, glabri; folia longe petiolata, petiolis alatis usque ad 3 cm. longis; lamina coriacea, glabra, crenulata, oblanceolata vel oblanceolato-oblonga, 6–17 cm. longa, 3–5.5 cm. lata, apice acuminata, basi acutiuscula; inflorescentia parce papillata, pauciflora; pedicelli 4–12 mm. longi; sepala 5, libera, ovato-lanceolata, 2.2–2.8 mm. longa, punctata, ciliata; bacca globosa, ca. 6 mm. diam.

A tree, 7 to 8 m. high, the twigs stout, rigid, drying reddish-brown, apparently glabrous. Leaves coriaceous, conspicuously long-petiolate, the petioles up to 3 cm. long, thick, narrowly winged by the decurrent base of leaf blade. Leaf blades coriaceous, glabrous, crenulate, oblanceolate or oblanceolate-oblong, 6 to 17 cm. long, 3 to 5.5 cm. wide, apex acuminate,

base narrowed and decurrent, midrib slightly impressed above, prominent beneath, the lateral veins slender but evident on undersurface, reticulation rather obscure. Inflorescence sparsely papillate, terminal and axillary, shorter than the leaves, paniculate, the flowers subcorymbose. Pedicels sparsely papillate, 4 to 12 mm. long. Sepals 5, free almost to base, ovate-lanceolate, 2.2 to 2.8 mm. long, acute, rather sparsely punctate with small glands, the margin ciliate with gland-tipped hairs, sometimes erose. Fruits immature, punctate, drying reddish, with shallow vertical grooves, subglobose, about 6 mm. in diam.

MEXICO: Chiapas, Pinabeto, near Motozintla, in virgin forest, alt. 2585 m., July 9, 1945, *Eizi Matuda 5462* (type, LL), tree, 7 to 8 m. high.

Evidently referable to the subgenus *Icacorea*, *A. angustialata* probably is nearest *A. crenipetala* Mez, which has petioles about 6 mm. long and pedicels up to 3 mm. long. Another species, *A. multilineata* Mez, described from Guatemala, may have affinity to *A. angustialata*, but it likewise has short petioles, and apparently differs further in pedicel length and flower size.

The narrowly winged petioles up to 3 cm. long, the coriaceous and crenulate leaf blades, and the rather small terminal and axillary papillate panicles serve to distinguish *A. angustialata.*

ARDISIA AMPLIFOLIA Standl., Field Mus. Bot. 4: 249. 1929.

BRITISH HONDURAS: Stann Creek District, Stann Creek Valley, Bocawina Hill, in high ridge, Feb. 12, 1940, *Percy H. Gentle 3215* (LL), small tree, fruits black at maturity.

Described from Nicaragua, this is the first record for the species in British Honduras.

Ardisia cucullata Lundell, sp. nov.

Arbor parva, ramuli crassi, glabri; folia integra, chartacea, glabra, petiolata, petiolo crasso 8–15 mm. longo; lamina oblongo-elliptica vel oblanceolato-oblonga, 12–20 cm. longa, 4–7.5 cm. lata, basi acutiuscula, apice acuta vel subacuminata; inflorescentia terminalis, multiflora, glabra, racemoso-paniculata, punctata; pedicelli 1–3 cm. longi; flores 5-meri; sepala fere libera, ovato-elliptica, rotundata, ciliata, punctata; corolla 7–9 mm. longa, punctata; petala symmetrica, extus obtusa, intus cucullata; filamenta pilis glandulosis pubescentia; ovarium glabrum, punctatum.

A tree, 5 m. high, the branches rather stout, minutely papillate in leaf axils, otherwise glabrous. Leaves entire, black-punctate, chartaceous, glabrous except along upper surface of petiole, the petiole inconspicuously lepidote above, rather stout, 8 to 15 mm. long, narrowly winged by the decurrent leaf base. Leaf blades oblong-elliptic or oblanceolate-oblong, 12 to 20 cm. long, 4 to 7.5 cm. wide, base acutish and decurrent, apex acute or subacuminate, reticulate-veined. Inflorescence terminal, broadly pyramidal, up to 15 cm. wide, 12 cm. high, punctate, glabrous, the flowers racemose. Pedicels slender, 1 to 3 cm. long. Flowers 5-merous, pink, conspicuously black-punctate. Calyx 4 to 4.5 mm. long, the sepals quincuncial or imbricate, united at base, ovate-elliptic, rounded at apex, ciliate, lepidote-papillose at base within, black-punctate, medially with lines. Corolla 7 to 9 mm. long, petals united at base into tube up to 2.5 mm. long, the tube pubescent outside with gland-tipped hairs, lepidote-papillose within, the petals symmetrical, black-punctate, medially with lines, the two outer petals larger, elliptic-lanceolate, obtuse at apex, the three inner cucullate at apex. Stamens attached about 1.5 mm. above base of corolla tube, filaments stout, 2 to 2.5 mm. long, pubescent with gland-tipped hairs. Anthers 3 to 4.5 mm. long, not punctate, apex rounded and abruptly apiculate. Ovary ovoid, black-punctate, glabrous, tapering into the slender style 6 to 7 mm. long, the style punctate below. Placenta ovoid, acicular at apex, the ovules pluriseriate, numerous.

MEXICO: Chiapas, Fraylesca, near Siltepec, alt. 2000 m., March 7, 1945, *Eizi Matuda 5201* (type, LL), tree, 5 m. high.

Referable to the subgenus *Pickeringia*, *A. cucullata* superficially resembles *A. paschalis* Donn. Sm. and related species with racemose-paniculate inflorescences and elongated pedicels. But it appears to have closer affinity to *A. coriacea* Swartz of the West Indies, a species with pedicels only 3 mm. long, and glabrous flowers 4 to 4.5 mm. long.

A. cucullata can be easily distinguished by its glandular-pubescent filaments, symmetrical petals, the inner cucullate, papillate indumentum of the corolla tube, sepals quincuncial or imbricate, large pink racemose flowers, pedicels up to 3 cm. long, and comparatively large acute or subacuminate leaves. Noteworthy is the awl-shaped apex of the placenta.

ARDISIA ERYTHROCARPA Lundell, Wrightia 2: 59. 1960.

BRITISH HONDURAS: Toledo District, near San Antonio, in broken cohune ridge, Nov. 22, 1951, *Percy H. Gentle 7525* (LL), tree, 2 in. diam., flowers white, scented. GUATEMALA: Department of Peten, San Luis, km. 52 of road south of village, on forest floor in dense shade, July 10, 1959, *C. L. Lundell 16267* (type, LL), arborescent shrub, 6 ft. high, fruits depressed globose, bright red; same locality, July 12, 1959,

Lundell 16382 (LL), slender shrub, 6 ft. high, fruits depressed globose ovoid, or dark red; Remate, on Tikal Road about 6 km. ne. of village, Mar. 16, 1960, *Elias Contreras 678* (LL), shrub, 2 ft. high, fruit red; Dolores, bordering Arroyo Ixcol, 800 m. east of village, in high forest, Apr. 14, 1961, *Contreras 2071* (LL), small tree, 10 ft. high, fruit red, "*chalche*"; same locality, *Contreras 2171* (LL), *2243* (LL), *2605* (LL), *2625* (LL); Santo Toribio, in high forest bordering the village, July 28, 1961, *Contreras 2703* (LL), arborescent shrub, 1 in. diam., 7 ft. high, flowers white.

The calyx of *A. erythrocarpa* is 2 mm. long, and the five free sepals are ovate, acutish, minutely ciliate and punctate. The five petals are united at base, asymmetrical, lanceolate-oblong, 6 to 9 mm. long, up to 4 mm. wide, obtuse and laterally emarginate at apex, minutely glandular puberulent within at base. The filaments are minutely glandular puberulent, 1.5 to 2 mm. long, attached at base of corolla. The anthers are lanceolate-linear, 3 to 4 mm. long, apiculate, attached to filament near base. The ovary is glabrous and the slender style is about 5 mm. long.

Among the related species with glandular puberulent filaments, *A. erythrocarpa* is perhaps closest to *A. Carlsonae* Steyermark, but from description it differs in having distinctly smaller sepals, petals, anthers and style, as well as larger leaves. *A. Mitchellae* Johnston has glabrous leaves, and anthers 6 to 7.5 mm. long while those of *A. erythrocarpa* are not over 4 mm. long. In *A. Tuerckheimii* Donn. Sm. the glabrous leaves are entire and the sepals are not ciliate.

ARDISIA GENTLEI Lundell, Field Lab. 13: 11. 1945.

BRITISH HONDURAS: Toledo District, Bolo Camp, upper reach of Golden Stream, in high ridge, April 28, 1944, *Percy H. Gentle 4561* (type, LL), tree, 9 in. diam., "*caraso berries*"; Jacinto Creek, Rio Grande, in broken ridge, Oct. 27, 1944, *Gentle 4921* (LL), tree, 10 in. diam., flowers whitish, bark grayish white, wood creamish color and hard, "*caraso berries*"; beyond Union Camp, Edwards Road, beyond Columbia, in high ridge, April 3, 1948, *Gentle 6502* (LL), tree, 9 in. diam., "*wild spice*"; near Mafridyle Lagoon, in broken cohune ridge, May 15, 1952, *Gentle 7694* (LL), tree, 8 in. diam. GUATEMALA: Department of Peten, Lacandon, on El Caribal, bordering the river, about 6 km. sw. of village, Feb. 5, 1962, *Elias Contreras 3322* (LL), tree, 4 in. diam., 35 ft. high.

In *A. Gentlei* the indumentum of the thick angular branches of the inflorescence is reddish, furfuraceous. The pedicels are up to 2 mm. long, and the imbricate sepals are broadly ovate and ciliate, up to 2 mm. long, rounded at apex. The corolla, 4 to 4.5 mm. long, is lepidote-papillose at base within and united into a tube 1.5 to 2 mm. high, and the petals are oblong-elliptic, essentially symmetrical, dextrorsely imbricate. The stamens equal or exceed the corolla, with filaments united at base and adhering

to corolla tube. The anthers are narrowly ovate-triangular, up to 1.5 mm. long, tapered to the apiculate apex, borne on filaments up to 3 mm. long, and subsagittate. The style is slender, about 3 mm. long.

Described originally from fruiting specimens, the flowers show a closer relationship of *A. Gentlei* to *A. densiflora* Krug & Urb. of Jamaica than to *A. spicigera* Donn. Sm. of Chiapas. The latter species is described as entirely glabrous with flowers sessile. I have not seen specimens of *A. densiflora*, but that species is described as having much smaller leaves, a glabrous inflorescence, and petals "breviter connata" compared with corolla tube connate fully one-third in *A. Gentlei*. *A. scoparia* Mez of Colombia, of this relationship, has pedicels up to 4 mm. long. All four species are very close.

ARDISIA PULVERULENTA Mez, Pflanzenreich IV. 236: 88. 1902.

BRITISH HONDURAS: Stann Creek District, Stann Creek Valley, 17 Miles, Feb. 7, 1940, *Percy H. Gentle 3205* (LL), tree, 2 in. diam.; same locality, Mountain Cow ridge, Mar. 30, 1940, *Gentle 3294* (LL), tree, 4 in. diam., berries red, "*blossomberry grape*"; Toledo District, Swasey Branch, Monkey River, beyond falls, in high ridge, Mar. 18, 1942, *Gentle 3982* (LL), shrub, "*high ridge blossom berry*"; Stann Creek District, Humming Bird Highway, 30 Miles Section, in high ridge, Mar. 3, 1958, *Gentle 9665* (LL), shrub.

Not recorded previously from British Honduras, the species was reported by Mez (l.c.) from Guatemala.

ARDISIA SCHIPPII Standl., Field Mus. Bot. 12: 412. 1936.

GUATEMALA: Department of Peten, Julec, km. 51 of road between Santo Toribio and Santa Ana, in high forest, July 26, 1961, *Elias Contreras 2675* (LL), tree, 5 in. diam., 30 ft. high, flowers lilac colored, fruit brownish.

The species, described from British Honduras, is new to Guatemala.

Ardisia sexpartita Lundell, sp. nov.

Arbor, ramuli crassi, glabri; folia petiolata, petiolo 1–1.5 cm. longo; lamina subcoriacea, glabra, obscure crenulata, oblanceolata, 13.5–24 cm. longa, 4.5–6.5 cm. lata, basi cuneata, apice acuminata; inflorescentia terminalis, paniculata, multiflora, racemosa vel subcorymbosa, glabra; pedicelli crassi, 4–15 mm. longi; flores 5- vel 6-meri; sepala punctata, crassa, late ovata, 3–4 mm. longa, ciliolata; corolla 9–10 mm. longa, punctata, intus lepidoto-papillosa, petala subsymmetrica, basi ca ⅓ connata; filamenta lepidoto-papillosa, 3–3.5 mm. longa; ovarium glabrum, punctatum.

Tree, 10 m. high, twigs thick, glabrous, drying brown. Leaves petiolate, the petioles thick, marginate from the decurrent base of leaf blade, 1 to 1.5 cm. long. Leaf blades subcoriaceous, glabrous, obscurely crenulate or subentire, oblanceolate, 13.5 to 24 cm. long, 4.5 to 6.5 cm. wide, base cuneate, apex acuminate, the lateral veins slender, strongly ascending, rather obscure. Inflorescence terminal, pyramidal, paniculate, 8 cm. wide, 10 cm. high, with thick rachis and branches, subtended by large deciduous bracts, the flowers racemose or subcorymbose, 5- or 6-merous. Pedicels thick, 4 to 15 mm. long, glabrous. Sepals thick, free, quincuncial or imbricate, broadly ovate, 3 to 4 mm. long, rounded at apex, black-punctate, medially with lines, ciliolate with gland-tipped hairs, lepidote-papillate within at base, otherwise glabrous. Corolla 9 to 10 mm. long, black-punctate, medially the lines slender, lepidote-papillate within at base, the petals subsymmetrical, lanceolate-elliptic, the inner inconspicuously cucullate, united at base into tube 2.5 to 3 mm. high. Filaments slender above, 3 to 3.5 mm. long, pubescent with gland-tipped hairs. Anthers 3 to 4 mm. long, apiculate. Ovary glabrous, punctate, the style slender, about 7.5 mm. long, punctate. Placenta subglobose, apiculate, the ovules pluriseriate, numerous. Berries globose, about 7 mm. diam.

GUATEMALA: Department of Quezaltenango, lower south-facing slopes of Volcan Santa Maria, near San Juan Patzulin, wooded slopes at edge of forest, alt. 1300—1500 m., Jan. 6, 1940, *Julian A. Steyermark 33608* (type, LL), tree, 30 ft. tall; leaves subcoriaceous, dark green above, paler beneath; corolla lobes waxy, pink; stamens light yellow.

Two additional collections, *Eizi Matuda 2392* (LL) from Volcan Tacana in Chiapas, and *Steyermark 37367* (LL) from Volcan Tajumulco in Guatemala are referable here.

With large deciduous bracts and flowers mostly racemose, *A. sexpartita* appears to belong to the subgenus *Pickeringia*. It is anomalous in having 5- or 6-merous flowers.

Parathesis crassiramea Lundell, sp. nov.

Arbor parva, ramuli crassiusculi, novelli minute peradpresse tomentelli; folia longe petiolata, petiolo 1–2.5 cm. longo; lamina chartacea, integra vel subintegra, punctata, glabra, lanceolata vel oblongo-lanceolata, 8.5–15 cm. longa, 3.5–5.8 cm. lata, apice obtuse acuminata, basi acutiuscula; inflorescentia terminalis, paniculata, peradpresse ferrugineo-tomentella; pedicelli crassi, 1–2 mm. longi; flores ante anthesin 5–6 mm. longi, tomentelli; sepala basi breviter coalita anguste triangularia, acuta, ca. 1.4 mm. longa;

petala valvata, lineari-lanceolata, ca. 6 mm. longa, intus villosa; filamenta glabra, crassa, ca. 1.8 mm. longa; antherae ovato-oblongae, ca. 2.5 mm. longae; ovarium minute tomentosum.

Small tree, 5 m. high, the twigs thick, the buds and young growth covered at first with minute closely appressed indumentum, glabrescent. Leaves glabrous at maturity, long petiolate, the petioles slender, canaliculate, 1 to 2.5 cm. long. Leaf blades chartaceous, essentially entire, punctate, lanceolate or oblong-lanceolate, 8.5 to 15 cm. long, 3.5 to 5.8 cm. wide, apex acuminate, the acumen obtusish, base acutish, lateral veins impressed above, conspicuous on undersurface. Inflorescence terminal, the rachis and branches thick, covered with minute closely appressed brownish indumentum, the panicles up to 11 cm. long, 7 cm. wide at base, flowers subcorymbose. Pedicels very thick, 1 to 2 mm. long. Flowers in bud 5 to 6 mm. long. Calyx finely tomentose, the 5 lobes triangular, about 1.4 mm. long, united at base. Petals 5, valvate, finely tomentose, villous within, linear-lanceolate, about 6 mm. long, black-punctate with lines, united at base about 1.8 mm. Filaments glabrous, stout, about 1.8 mm. long. Anthers erect, large, ovate-oblong, about 2.5 mm. long, attached to filament above base, conspicuously black-punctate. Ovary ovoid, finely tomentose, the style slender, about 5 mm. long. Placenta uniseriate or partially biseriate, the ovules 8 or 9.

COSTA RICA: Prov. Alajuela, Canton Alfaro Ruiz, La Peña de Zarcero, cloud forest, July 11, 1938, *Austin Smith 896* (type, LL; F), tree, 5 m., bark pale brown, leaves with deep venation producing rugose effect, inflorescence pink, petals fleshy and reflexed.

In the genus *Parathesis*, no other species has thick inflorescence branches and pedicels like *P. crassiramea*. The pedicels are about as thick as they are long with no constriction below the calyx. The long petioles, petals villous within, large ovate-oblong erect anthers, and finely tomentose ovary distinguish it further. The 8 or 9 ovules are partially biseriate, but this may be due to dislocation of ovules from pressure applied in drying the specimens.

P. crassiramea has affinity to *P. serrulata* (Sw.) Mez.

Parathesis pallida Lundell, sp. nov.

Arbor parva, ramuli novelli ferrugineo-tomentelli; folia longe petiolata, petiolo 1–2.5 cm. longo; lamina integra, glabrata, pallida, chartacea, obovata, elliptico-oblanceolata vel oblanceolata, 9–15 cm. longa, 2.5–6 cm. lata, apice obtuse subacuminata vel acuminata, basi acuminata;

inflorescentia terminalis, paniculata, ferrugineo-tomentella; pedicelli ca 4 mm. longi; flores pentameri, corymbose dispositi; sepala punctata, basi breviter coalita anguste triangularia, acuta, ca. 1 mm. longa; petala punctata, valvata, lineari-lanceolata, ca. 5 mm. longa, apice villosa; filamenta glabra, ca. 2.5 mm. longa; antherae oblongae, ca. 1.5 mm. longae; ovarium minute tomentosum.

Tree, 6 to 8 m. high, twigs brownish and finely appressed tomentose. Leaves at first with fine appressed indumentum, glabrescent, long petiolate, the petioles canaliculate, 1 to 2.5 cm. long. Leaf blades pallid, paler beneath, entire, chartaceous, obovate, elliptic-oblanceolate or oblanceolate, 9 to 15 cm. long, 2.5 to 6 cm. wide, apex obtusely subacuminate to acuminate, base acute or acuminate, the lateral veins evident but inconspicuous. Inflorescence terminal, paniculate, pyramidal, up to 15 cm. long, 10 cm. wide, finely brownish-tomentose, with flowers subcorymbose. Pedicels tomentose, usually about 4 mm. long, ranging from 2 to 5 mm. long. Flower buds about 4 mm. long, slenderly pyriform. Calyx small, tomentose, the sepals narrowly triangular, about 1 mm. long, acute, punctate. Petals 5, rather sparingly pubescent outside, villous within at apex, linear-lanceolate, about 5 mm. long, punctate with black lines, united at base, reflexed. Filaments glabrous, slender, punctate, about 2.5 mm. long. Anthers versatile, attached medially, small, slender, oblong, about 1.5 mm. long, sparingly black-punctate, dehiscent longitudinally. Ovary ovoid, tomentose, the slender style about 3.5 mm. long. Placenta uniseriate, ovules 10 or 11.

NICARAGUA: Department of Zelaya, Rio Sicsicuas, abandonos de banano, guamilares de segunda clase, alt. 0.15 m., April 27, 1949, *Antonio Molina R. 2468* (type, F; photo, LL), fls. blanco-rosado, *"zarcil."*

From Honduras, the species is represented by *Molina 2826* (F), *2859* (F), also from Nicaragua by *Paul C. Standley 8816* (F), and from Costa Rica by *Austin Smith P2562* (LL).

Although related to *P. serrulata* (Sw.) Mez and *P. lanceolata* Brandegee, it differs at once in having small versatile oblong anthers borne on long filaments. *P. pallida* is distinguished further by its flower buds which are slender pyriform before anthesis.

EBENACEAE

DIOSPYROS ANISANDRA Blake, Proc. Biol. Soc. Wash. 34: 44. 1921; Lundell, Carnegie Inst. Publ. 478: 220. 1937.

MEXICO: Yucatan, near Yokdzonoot, in advanced deciduous forest, June 10, 1938, *C. L. Lundell & Amelia A. Lundell 7496* (LL), tree, 2 in. diam., 25 ft. high, corolla of staminate flowers yellow-green; same locality, July 14, 1938, *Lundell & Lundell 7925* (LL), shrub or treelet, abundant in undergrowth; Chichen Itza, off Kaua road, June 12, 1938, *Lundell & Lundell 7530* (LL), shrub or treelet, 8–12 ft. high, corolla yellow-green; near Libre Union, June 15, 1938, *Lundell & Lundell 7563* (LL), arborescent shrub; off Piste-Libre Union road, June 15, 1938, *Lundell & Lundell 7568* (LL), shrub, 8 ft. high, corolla of pistillate flowers creamy-white or pale green; Uxmal, in thicket covering ruins, July 28, 1938, *Lundell & Lundell 8165* (LL), shrub, 8 ft. high, abundant all over Yucatan; Campeche, Calakmul, Dec. 31, 1931, *C. L. Lundell 1154* (photo, LL), shrub growing on top of temple. GUATEMALA: Department of Peten, Lake Peten Itza, east of San Jose, abundant in forest on gypsum cliffs along north shore of lake, Jan. 22, 1962, *C. L. Lundell 17227* (LL), *17232* (LL), slender shrub, fruits shiny, black.

Not previously recorded from Guatemala, this slender shrub is abundant in forest on the dry steep gypsum escarpment along the north shore of Lake Peten Itza. Collected only once in Campeche, on the top of a temple in Calakmul, the species is the most abundant representative of the genus in the deciduous forest of Yucatan.

DIOSPYROS BUMELIOIDES Standl., Trop. Woods 18: 31. 1929; Lundell, Carnegie Inst. Publ. 478: 72, 220. 1937.

GUATEMALA: Department of Peten, Tikal National Park, Bajo de Santa Fe, in *chololal* bordering *pinal*, March 7, 1960, *C. L. Lundell 16710* (LL), arborescent shrub, 12 ft. high; same locality, near Aguada Pucte off Aguada Terminos Road, in *tintal*, Jan. 13, 1962, *C. L. Lundell 17077* (LL), tree, 4 in. diam., 20 ft. high; same locality, in *tintal* on Aguada Terminos Road, Sept. 26, 1959, *Elias Contreras 195* (LL), tree, 10 in. diam., 40 ft. high; same locality, in *tintal* on *pinal* trail, Feb. 2, 1960, *Contreras 589* (LL), tree, 7 in. diam., 25 ft. high.

Although usually an arborescent shrub, *D. bumelioides* is a common tree in Bajo de Santa Fe. These are the first collections of the species in Guatemala, but it is abundant in the logwood swamps of Campeche. The type is *Lundell 137* from Honey Camp, Orange Walk District, British Honduras, where it was found in a *tintal*.

DIOSPYROS CUNEATA Standl., Field Mus. Bot. 8: 33. 1930; Lundell, Carnegie Inst. Publ. 478: 220. 1937.

MEXICO: Yucatan, Progreso, on low sand dunes near the port, June 2, 1938, *C. L. Lundell & Amelia A. Lundell 7393* (LL), shrub, 4 ft. high; near Yokdzonoot, in advanced deciduous forest, June 10, 1938, *Lundell & Lundell 7488* (LL), tree, 4 in. diam., 25 ft. high, corolla creamy-white; Chichen Itza, in old thicket covering the ruins, June 17, 1938, *Lundell & Lundell 7599* (LL), tree, 2 in. diam., 12 ft. high, "*silil*"; Progreso, on low sand dunes west of port, July 17, 1938, *Lundell & Lundell 7943* (LL), shrub,

6 ft., abundant in scrub; Quintana Roo, Coba, east of ruins in advanced deciduous forest, June 27, 1938, *Lundell & Lundell 7637* (LL), tree, 10 in. diam., 45 ft. high, abundant in this locality; Coba, along Dzitnup trail near Dzitnup, July 8, 1938, *Lundell & Lundell 7851* (LL), small tree in second growth.

The type is from Yucatan, *Geo. F. Gaumer 24098*, and the species extends through Quintana Roo down the east coast of the Yucatan Peninsula to the Corozal District of British Honduras where it was collected at Corozal, *Percy H. Gentle 292*.

DIOSPYROS YATESIANA Standl., Carnegie Inst. Publ. 461: 81. 1935; Lundell, Carnegie Inst. Publ. 478: 219. 1937.

MEXICO: Campeche, Tuxpeña, Feb. 10, 1932, *C. L. Lundell 1309* (type, F); Chan Laguna, Dec. 5, 1931, *Lundell 1020* (photo, LL), tree, 0.5 m. diam., 15 m. high; Tabasco, Reforma, near Balancan, May 22–26, 1939, *Eizi Matuda 3188* (LL), tree, 25 cm. diam., 10 m. high. GUATEMALA: Department of Peten, Tikal National Park, Aguada Terminos, in *zapotal*, Feb. 17, 1959, *Lundell 15617* (LL), tree, 6 in. diam., 30 ft. high; Tikal, in *ramonal*, July 8, 1959, *Lundell 16240* (LL), tree, 8 in. diam., 40 ft. high, ripe fruits orange colored; Tikal National Park, on *pinal* trail, Mar. 8, 1960, *Lundell 16767* (LL), tree, 40 ft. high; Tikal, in *ramonal*, Jan. 11, 1962, *Lundell 17030* (LL), tree, 6 in. diam., 30 ft. high; Tikal National Park, on Remate Road, in *zapotal*, Jan. 15, 1962, *Lundell 17094* (LL), tree, 3 in. diam., 25 ft. high; Remate, Mar. 31, 1960, *Elias Contreras 758* (LL), tree, 4 in. diam., 20 ft. high, flowers white; same locality, April 8, 1960, *Contreras 801* (LL), *809* (LL), *810* (LL), *811* (LL); between Remate and San Jose, on gypsum escarpment along north shore of Lake Peten Itza, April 16, 1960, *Contreras 837*, shrub, 2 in. diam., 6 ft. high; Tikal National Park, in *escobal* on Uaxactun trail, Aug. 15, 1960, *Contreras 1414* (LL), tree, 5 in. diam., 25 ft. high.

Ranging from an arborescent shrub in dry exposed places to a medium sized forest tree of the *zapotal* and *escobal*, *D. Yatesiana* is encountered only occasionally. A determined effort to obtain good staminate and pistillate flowering material, as well as mature fruits, accounts for the large series of collections. Previously known from Campeche and Tabasco, these are the first records of the tree for Guatemala.

The species is noteworthy for its very small white-strigose flowers borne in axillary cymes.

DIOSPYROS YUCATANENSIS Lundell, Carnegie Inst. Publ. 478: 217. 1937.

Diospyros spectabilis Lundell, Carnegie Inst. Publ. 478: 218. 1937.

MEXICO: Quintana Roo, Coba, east of ruins in advanced deciduous forest, June 30, 1938, *C. L. Lundell & Amelia A. Lundell 7711* (LL), shrub or small tree, 2 in. diam., 20 ft. high, "*xuchuche*"; Campeche, Tuxpeña, in secondary swamp forest, Oct. 11, 1931, *C. L. Lundell 807* (isotype of *D. spectabilis*, LL), common tree; Tabasco, San Isidro,

near Balancan, June 7–11, 1939, *Eizi Matuda 3378* (LL), tree, 35 cm. diam., 15 m. high; Tenosique, in advanced forest, June 14–16, 1939, *Matuda 3401* (LL), tree, 5 m. high. GUATEMALA: Department of Peten, San Andres, on steep bank of Lake Peten Itza, May 4, 1933, *Lundell 3237* (isotype, LL), shrub, "*jaboncillo*"; Tikal, on top of Temple II, July 8, 1959, *Lundell 16257* (LL), small tree, 3 in. diam., 20 ft. high; Lake Peten Itza, about 1 km. west of San Andres, along escarpment of north shore of lake, Jan. 22, 1962, *Lundell 17260* (LL), slender shrub, hanging from gypsum cliff; Dos Lagunas, in *tintal*, about 9 km. east of village, Nov. 25, 1960, *Elias Contreras 1651* (LL), tree, 8 in. diam., 50 ft. high; Tikal National Park, in *ramonal* on *pinal* trail, 12 km. ne. of Tikal, Feb. 5, 1960, *Contreras 609* (LL), tree, 14 in. diam., 90 ft. high; Santo Toribio, Aug. 24, 1961, *Contreras 2761* (LL), small tree, 3 in. diam., 12 ft. high.

Numerous collections are available, but those cited show the variation in the species. On the same branch the fruits range from sessile to pedunculate with peduncles up to 1 cm. long, and the leaves from densely pubescent (immature) to glabrescent. *D. spectabilis* is clearly synonymous. *D. yucatanensis* has the widest distribution of any species of the Yucatan Peninsula, and it ranges in size from a shrub to large tree.

D. yucatanensis var. *longipedicellata* Lundell, to which I refer only the type collection, *Lundell & Lundell 7509* (LL), from Chichen Itza, Yucatan, differs in its slender recurved pistillate flower peduncle up to 1.4 cm. long, and smaller corolla. Additional collections are needed to determine its status.

SCROPHULARIACEAE

Russelia lilacina (Lundell) Lundell, comb. nov.

Russelia campechiana Standl. var. *lilacina* Lundell, Wrightia 2: 62. 1960.

GUATEMALA: Department of Peten, Tikal, on top of Temple IV, Feb. 6, 1959, *C. L. Lundell 15363* (type, LL), woody vine with stem 1.5 in. diam. at base, corolla lilac; same locality, on west side of Temple III, Jan. 17, 1962, *Lundell 17165* (LL), woody vine, 0.5 in. diam., corolla lilac.

The plants with lilac colored flowers range through southern Campeche, Peten, and British Honduras. Although I reluctantly segregate *R. lilacina* from *R. campechiana* Standl., the latter is distinguished by smaller red corollas.

A collection, *David R. Hunt 447* (LL), from El Cayo District, British Honduras is reported by the collector as having purplish flowers, as in *R. lilacina*, but its short petioles, less than 5 mm. long, suggest *R. syringaefolia* Schlecht. & Cham.

WOOD ANATOMY OF PETENAEA CORDATA LUNDELL (ELAEOCARPACEAE)

B. Francis Kukachka[1]

GROSS FEATURES

Growth rings not clearly defined. Sapwood thin and more or less sharply defined from the pale reddish-brown heartwood. Pores and wood rays not visible to the unaided eye. Bark very thin, nonfibrous. Pith small, round, brown. Specific gravity based on volume when green and weight when ovendry, 0.60.

MICROSCOPIC FEATURES

Vessels:—Maximum tangential diameters of 80 to 100 microns common; arrangement solitary, commonly in multiples of 2 to 5 pores and occasionally in long multiples of up to 12 pores. Radial arrangement of pores most common but occasionally pores are paired obliquely or nested. Perforations simple, oblique. Intervascular pitting alternate with slight tendency to opposite; 8 microns in diameter; pitting to wood rays similar to intervascular or linear and irregular. Tyloses present in heartwood. Mean vessel member length, 635 microns.

Parenchyma:—Lacking.

Wood rays:—Tending toward two-sized; the multiseriate commonly 3 to 5 (6) seriate and under 800 microns in height; the uniseriate rays composed of upright cells and usually under 350 microns in height. The ray cells as observed from tangential sections appear two-sized and irregularly dispersed within the ray; the cells of smaller diameter are procumbent or square as viewed from radial sections and the cells of larger diameter are vertically elongated on radial sections. Sheath cells present. Ray cell contents pale yellowish brown and sparse. Crystals not observed. Silica lacking. All rays decidedly heterogeneous.

---

[1] Forest Products Technologist, Forest Products Laboratory, Forest Service, U. S. Department of Agriculture, Madison, Wisconsin.

Fig. 2. Transverse section of *Petenaea* illustrating radial disposition of pores and fibers, 145×.

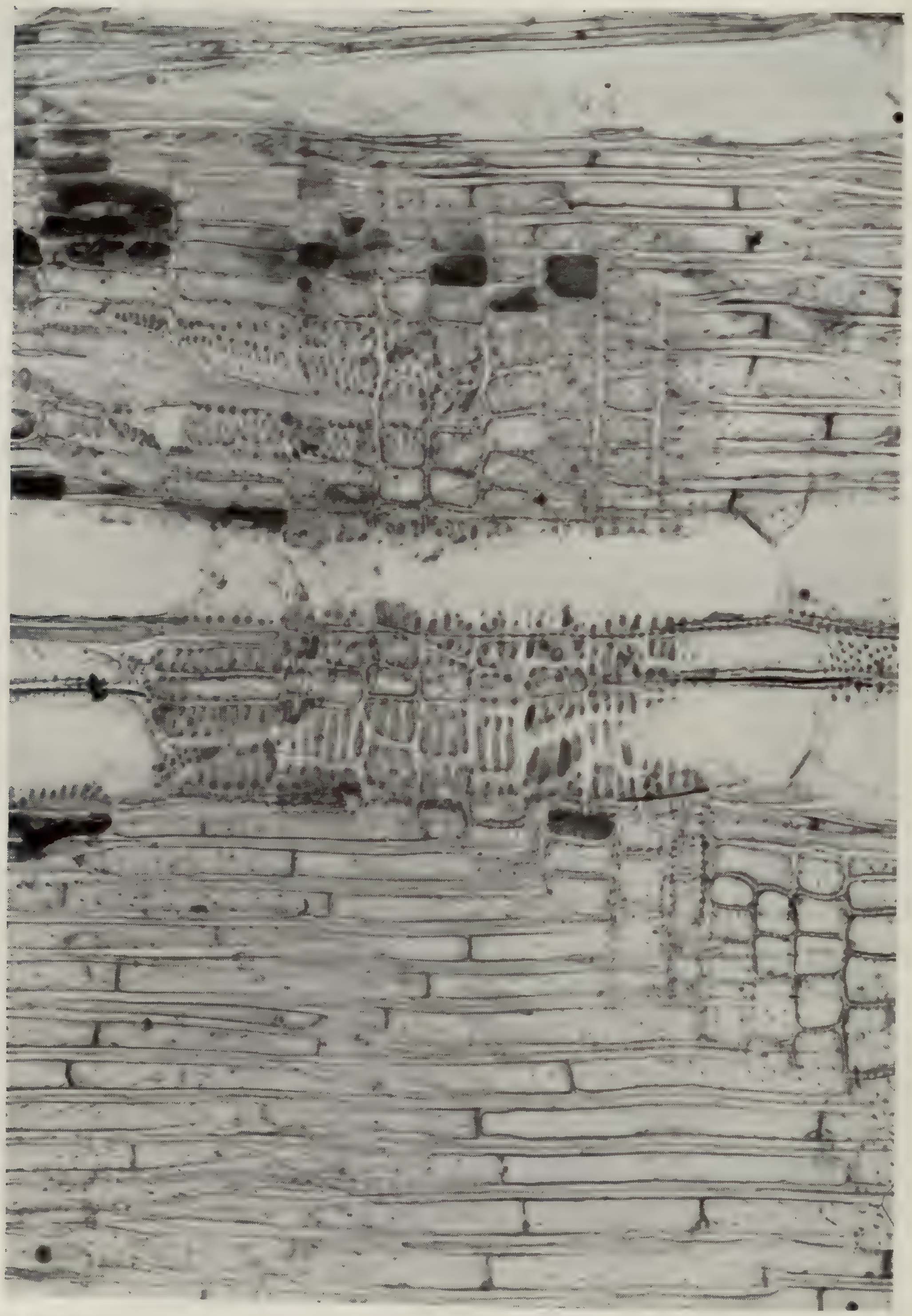


Fig. 3. Radial section showing the coarse vessel-ray pitting and conspicuous septa of the fibers, 180×.

Fig. 4. Tangential section showing the heterogeneous nature of the wood rays, 145×.

Fibers:—Radially alined as viewed from transverse sections; conspicuously septate; with minute pits. Mean fiber length, 1130 microns.

Pith:—Homogeneous.

Bark:—Nonfibrous; with sclerids; containing an abundance of rhombic crystals and druses.

Description based on *C. L. Lundell 17271* collected at Lake Peten Itza, Guatemala.

REMARKS

Petenaea is anatomically similar to the other members of the Elaeocarpaceae with the exception of *Muntingia* and *Dicraspidia*, which differ markedly from the other genera. Within the Elaeocarpaceae proper, *Petenaea* is distinguished by all of the fibers being conspicuously septate.

VOLUME 3 MARCH, 1963 NUMBER 3

WRIGHTIA

A BOTANICAL JOURNAL

CONTENTS

Reproduction of the Lovegrasses, the Genus Eragrostis—I. E. chloromelas Steud., E. curvula (Schrad.) Nees, E. Lehmanniana Nees and E. superba Peyr. By L. J. Streetman 41

Reproduction of the Lovegrasses, the Genus Eragrostis—II. E. bicolor Nees, E. plana Nees, E. intermedia Hitchc. and E. obtusa Munro. By L. J. Streetman 52

MISSOURI BOTANICAL

APR 15 1963

GARDEN LIBRARY

PUBLISHED BY
TEXAS RESEARCH FOUNDATION
RENNER, TEXAS

WRIGHTIA

WRIGHTIA, a botanical journal, is a publication of Texas Research Foundation. The contributions are by staff members and collaborators.

Each volume will contain a series of numbers, to be issued at irregular intervals. The subscription price for Volume 3 is $12.00, postpaid.

VOLUME 3, NUMBER 3
ISSUED MARCH 15, 1963

Printed in the U.S.A.
Etheridge Printing Company
Dallas, Texas

WRIGHTIA

VOLUME 3 MARCH, 1963 NUMBER 3

REPRODUCTION OF THE LOVEGRASSES, THE GENUS ERAGROSTIS—I. E. CHLOROMELAS STEUD., E. CURVULA (SCHRAD.) NEES, E. LEHMANNIANA NEES AND E. SUPERBA PEYR.[1]

L. J. STREETMAN[2]

The genus *Eragrostis* is composed of approximately two hundred eighty species and is one of the most widely distributed genera of grasses in the world. A wide variety of forms or varieties exists within many of the species. Quite often this wide range of types has led to confusion when research data of various workers are compared.[3] Polymorphism and the existence of integrating types between species prompted de Winter (5) to revise the taxonomy of *E. curvula* (Schrad.) Nees to include *E. chloromelas* Steud. and *E. robusta* Stent. Leigh[3] then suggested that, for pasture purposes, strains of *E. curvula* be grouped into five types: curvula, chloromelas, robusta blue, robusta green and robusta intermedia. This classification was based primarily on leaf color, texture and size, inflorescence and growth habit.

Species of *Eragrostis* were first introduced into the United States in the early 1930's and several of these have been used extensively for reseeding the arid and semi-arid range land of the Southwest (1, 4). The species of particular importance are *E. chloromelas*, E. *curvula*, *E. Lehmanniana* Nees and *E. superba* Peyr. Most of the lovegrasses are prolific seed producers, a characteristic almost indispensable for successful range re-vegetation. Their

[1] Paper No. 10 from the Hoblitzelle Agricultural Laboratory, Texas Research Foundation. This study was supported in part by the Amon G. Carter Foundation, Fort Worth, Texas.

[2] Cytogeneticist, Hoblitzelle Agricultural Laboratory, Texas Research Foundation. This study was initiated while the author was an employee of the Crops Research Division, Agricultural Research Service, U. S. Department of Agriculture, Tucson, Arizona. Acknowledgment is made to Neal Wright, Crops Research Division, Tucson, Arizona, for providing plant material and contributing to the planning of this investigation.

[3] Leigh, J. H. Some aspects of the anatomy, ecology and physiology of *Eragrostis*. Ph. D. Thesis. Univ. of the Witwatersrand. Johannesburg. 1960.

ability to green up earlier in the spring and remain green in the fall later than common native grasses also enhances their usefulness.

In spite of the importance of the lovegrasses, little plant improvement or genetic and cytogenetic work has been conducted on species of this genus. Chromosome numbers for several species have been reported (3) but the meiotic behavior and development of the female gametophyte is virtually unknown. Stover (12), working with the annual *E. cilianensis* (All.) Link., reported a new type of embryo-sac for the grass family. He found that the four nuclei at the micropylar end of the sac function as an egg, a synergid and two polar nuclei. The remaining four nuclei formed antipodal cells, thus, a chalazal nucleus did not take part in formation of the endosperm. Brown and Emery (2) examined one hundred twenty nine ovules of five *Eragrostis* species and reported *E. cilianensis* and *E. intermedia* as having normal 8-nucleate embryo-sacs, whereas *E. chloromelas*, *E. curvula* and *E. heteromera* Stapf, had one 4-nucleate sac in each ovule. Diplospory was postulated for the latter three species on the basis of the megasporocyte being vacuolate and lack of evidence of spore formation. Sexuality was not ruled out, however, because of the possibility that these species may have a different type embryo-sac development than is typical for the Gramineae in general. Others (7, 9) have considered *E. chloromelas* and *E. curvula* to be self-fertile, with cross-pollination usually occurring less than five per cent of the time.

Cytological and genetic investigations of grasses serve two primary purposes: (a), to furnish basic data which can be used in connection with morphological data in studies of taxonomy and phylogeny; and (b), to provide fundamental information necessary for improvement by breeding (11). Therefore, the primary objective of this study was to determine the mode of reproduction of these *Eragrostis* species. Such information would provide the foundation for a comprehensive cytotaxonomic study and permit the formulation of a well-planned breeding program.

MATERIALS AND METHODS

Plants of four species were selected for use in this study. The accession numbers, number of plants studied, number of ovules examined and chromosome numbers of each species are recorded in Table 1. These species are being given attention in the grass improvement programs at Texas Research Foundation, and in the Crops Research Division, Agricultural Research Service, U. S. Department of Agriculture, Tucson, Arizona. Voucher specimens of all accessions studied have been placed in the herbaria at Texas Research Foundation and the University of Arizona.

Table 1. *Eragrostis* Species, and Their Corresponding Accession Numbers, Studied Cytologically for Mode of Reproduction

Species	Accession Numbers	Number Plants Studied	Approximate Number Ovules Examined	Chromosome Numbers*
E. chloromelas	SW-63, 136, 144, 145, 148, 179, 308	35	4500	40, 80
E. curvula	SW-151, 154, 156	15	1650	40
E. Lehmanniana	SW-186, 187, 192	15	2100	40, 50
E. superba	SW-69, 207, 222	15	650	40

*Unpublished data, Streetman and Wright.

Ovaries for the study of megasporogenesis and embryo-sac development were obtained by collecting inflorescences twenty four hours after first sign of anthesis. In this manner, ovules at all stages of development were obtained for analysis. These inflorescences were taken from plants growing in one gallon cans in the greenhouse. Optimum time for collection was between 1:30 A.M. and 3:30 A.M. The inflorescences were placed in 3:1 absolute ethyl alcohol-glacial acetic acid and vacuated immediately. After a twenty four hour killing and fixing period, the many-flowered spikelets were cut from the inflorescence. These spikelets were left intact to facilitate orientation of the small ovaries during embedding and sectioning. Dehydration was accomplished by the tertiary-butyl-alcohol series as outlined by Johansen (8). The spikelets were than infiltrated and embedded in paraffin.

Ovaries sectioned at six microns were most satisfactory for studying megasporogenesis, whereas eight to ten micron sections were optimum for study of embryo-sac development. Sectioned ovaries were stained with safranin 0-fast green (8) and counter-stained with orange-G.

Photomicrographs were taken using an AO Spencer Model 682B Photomicrographic camera, in conjunction with an AO Spencer research microscope.

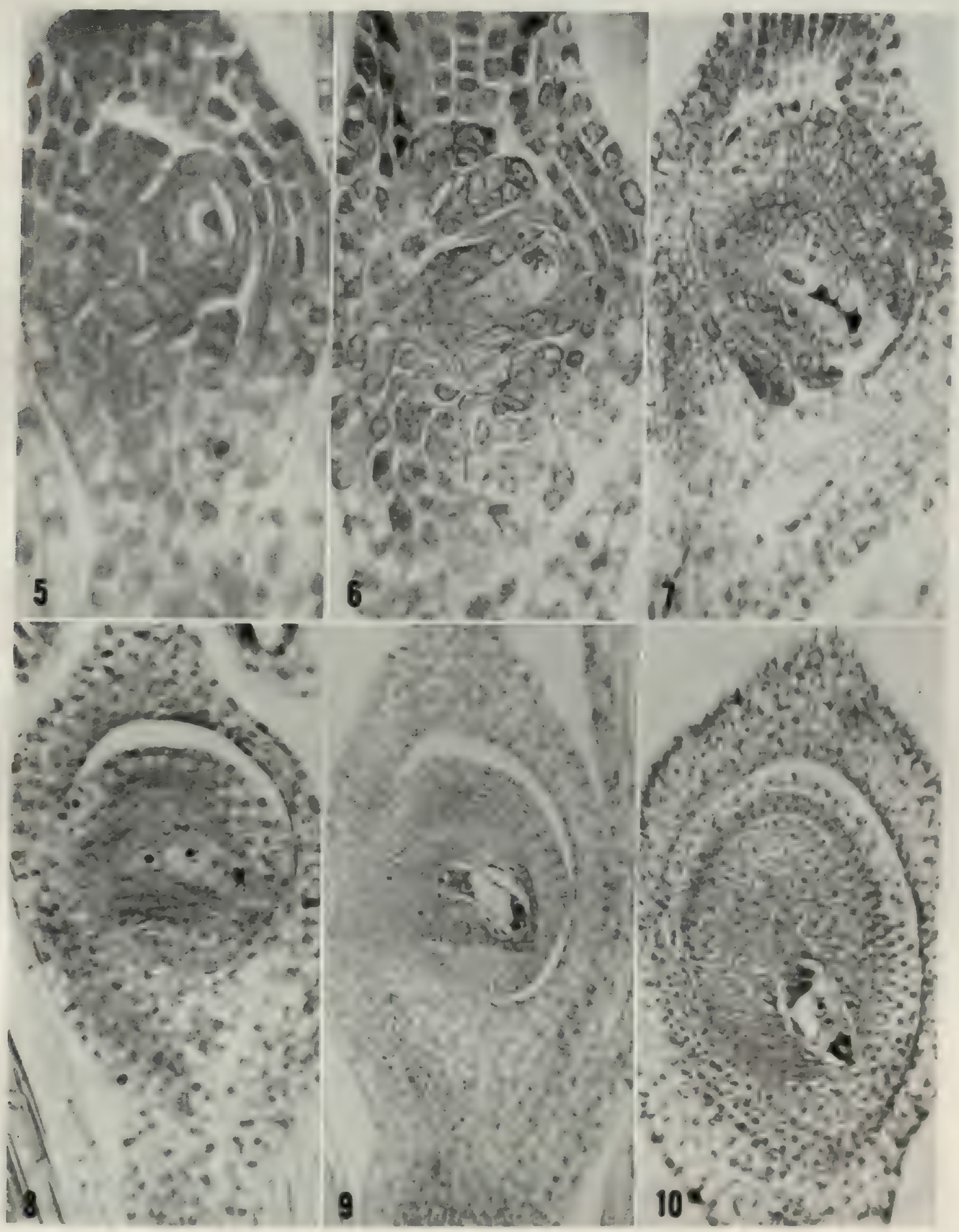
RESULTS

Megasporogenesis and embryo-sac development in *E. superba* proceeds in the classic manner of sexually reproducing species with the archesporial

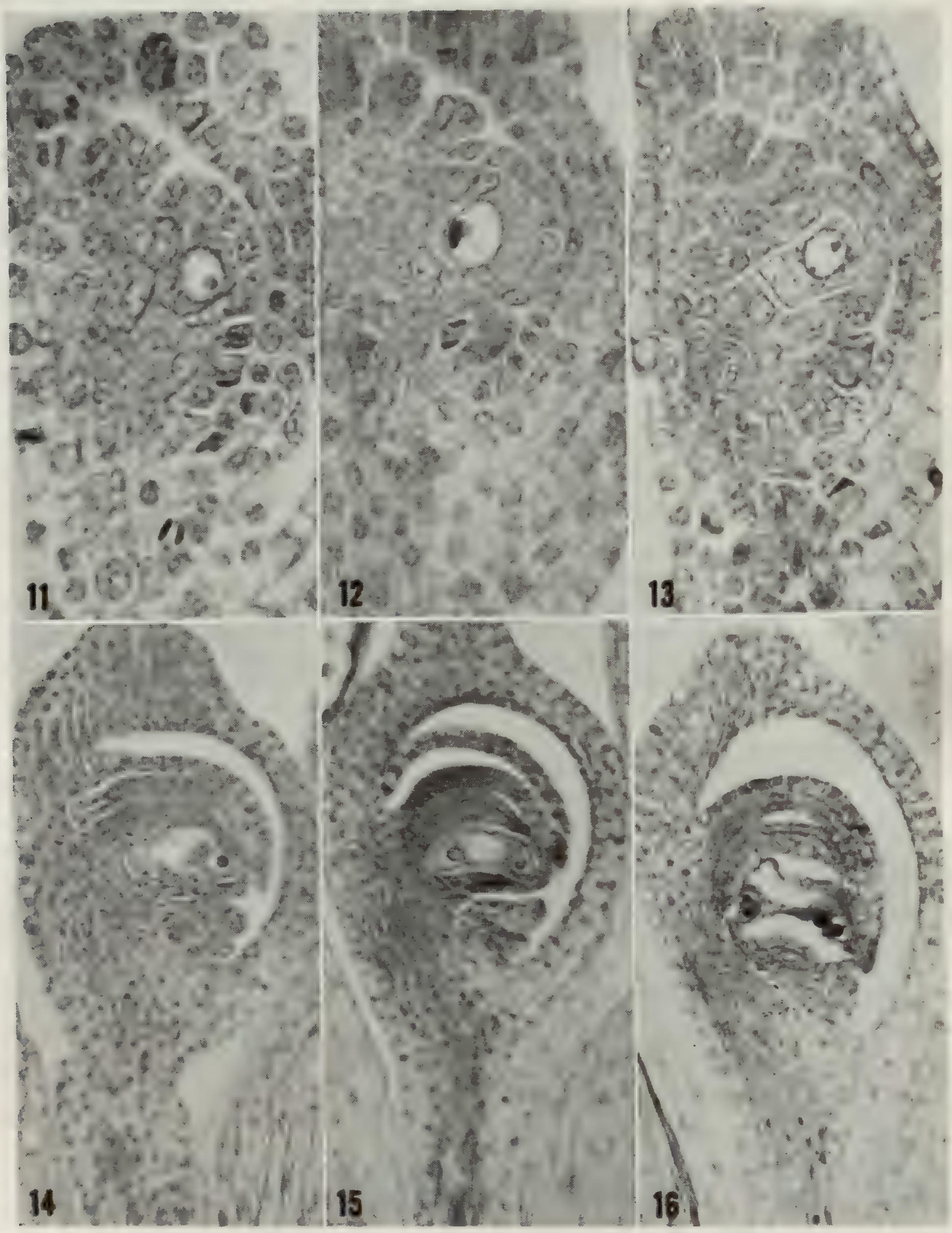
cell differentiating from a hypodermal cell of nucellar tissue. (Fig. 5). Without appreciable enlargement of the megaspore mother cell, meiosis proceeds rapidly (Fig. 6). Although a rapid killing and fixing solution was used, division figures for chromosome counts were not obtained. At the onset of meiosis, two successive divisions result in a linear tetrad of megaspores, whereupon three megaspores nearest the micropyle disintegrate, leaving the chalazal member as the functional megaspore (Fig. 7). The functional megaspore then divides mitotically to produce a 2-nucleate embryo-sac with each nucleus migrating to opposite ends of the sac cavity. The remains of disintegrated megaspores are still apparent at this stage of development (Fig. 8). Two successive mitotic divisions result in a 4-nucleate (Fig. 9) and finally an 8-nucleate embryo-sac. The embryo-sac develops into a mature gametophyte consisting of an egg, a polar nucleus (2n), two synergids and three antipodals (Fig. 10). The number of antipodals observed never exceeded three, therefore the embryo-sac is of the "*Polygonum* type" as described by Maheshwari (10).

Megasporogenesis and subsequent embryo-sac development of *E. chloromelas*, *E. curvula* and *E. Lehmanniana* deviates sharply from normal. Each of the species, however, has a similar developmental sequence and unless noted otherwise the following description of gametophyte development will apply to all. As with *E. superba*, gametogenesis begins with the differentiation of an archesporial cell from a subepidermal cell of the nucellus (Fig. 11). At this stage, abnormal development sets in. Rather than quickly proceeding through meiosis, enlargement and vacuolization of the cell begins. As this is occurring, a cluster of chromosomes associated with a nucleolus is evident resembling meiotic prophase (Fig. 12). This was interpreted as a weak attempt at meiotic division. The chromosomes then reorganize into a nucleus without further meiosis and the nucleolus begins to disappear (Fig. 13). That this phase of development occurs rapidly is exemplified by comparing integument growth in Figs. 11-13. Vacuolization and enlargement of the megaspore mother cell continues until the nucellar tissue is almost completely enclosed by the integuments (Fig. 14). At this stage of integument development in the sexual species, *E. superba*, meiosis is complete (Fig. 7), whereas in these species the 1-nucleate embryo-sac is ready to divide for the first time. Two successive mitotic divisions result in a 2-nucleate (Fig. 15) and then a 4-nucleate embryo-sac (Fig. 16).

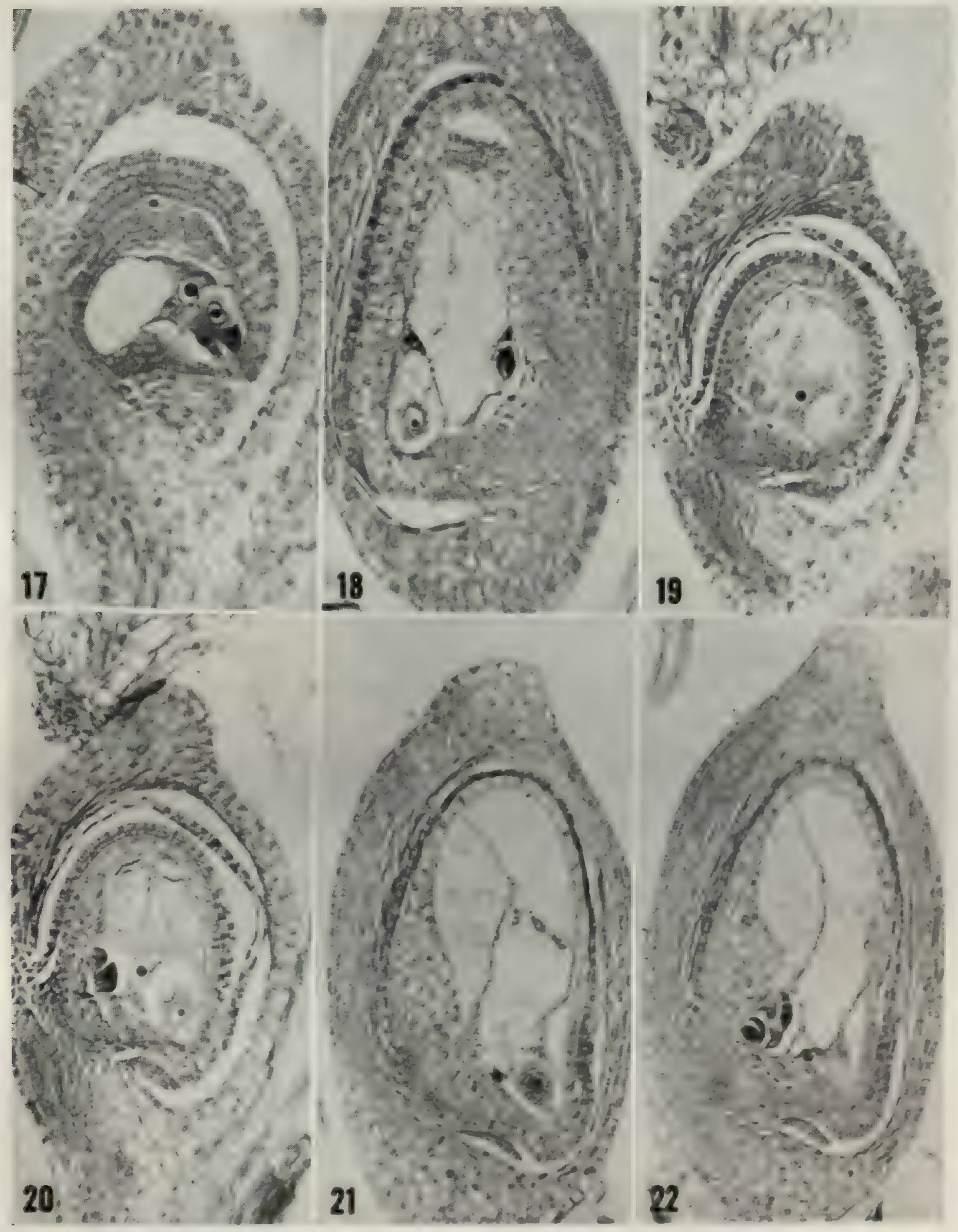
In three per cent of the mature embryo-sacs observed, there appeared to be no further nuclear division. Rapid orientation of the nuclei into two synergids, an egg and a polar nucleus completed the gametophyte (Fig. 17). Thirty per cent of the mature embryo-sacs examined were 5-nucleate; the nuclei being organized as an egg, a polar nucleus and three antipodals



Figs. 5–10, *Eragrostis*. Photomicrographs of ovules (longitudinal sections) showing megasporogenesis and embryo-sac development of *E. superba*. Fig. 5. Differentiation of archesporial cell. Fig. 6. Megaspore mother cell in prophase I of meiosis. Fig. 7. Functional megaspore; three megaspores nearest micropyle disintegrating. Fig. 8. 2-nucleate sac; remains of disintegrated megaspores. Fig. 9. 4-nucleate sac. Fig. 10. Mature sac consisting of an egg nucleus, a polar nucleus (2n), two synergids and three antipodals. Figs. 5–6, approximately 900×. Figs. 7–10, approximately 250×.



Figs. 11–22, *Eragrostis*. Photomicrographs of ovules (longitudinal sections) illustrating megagametogenesis in *E. chloromelas*, *E. curvula* and *E. Lehmanniana*. Fig. 11. Differentiation of archesporial cell. Fig. 12. Megaspore mother cell making attempt at meiosis; chromosomes remain in cluster associated with nucleolus. Fig. 13. Chromosome reorganized into nucleus; nucleolus disappearing. Fig. 14. Undivided megaspore mother cell; sac cavity enlarging. Fig. 15. 2-nucleate sac. Fig. 16. 4-nucleate sac. Fig. 17. Mature

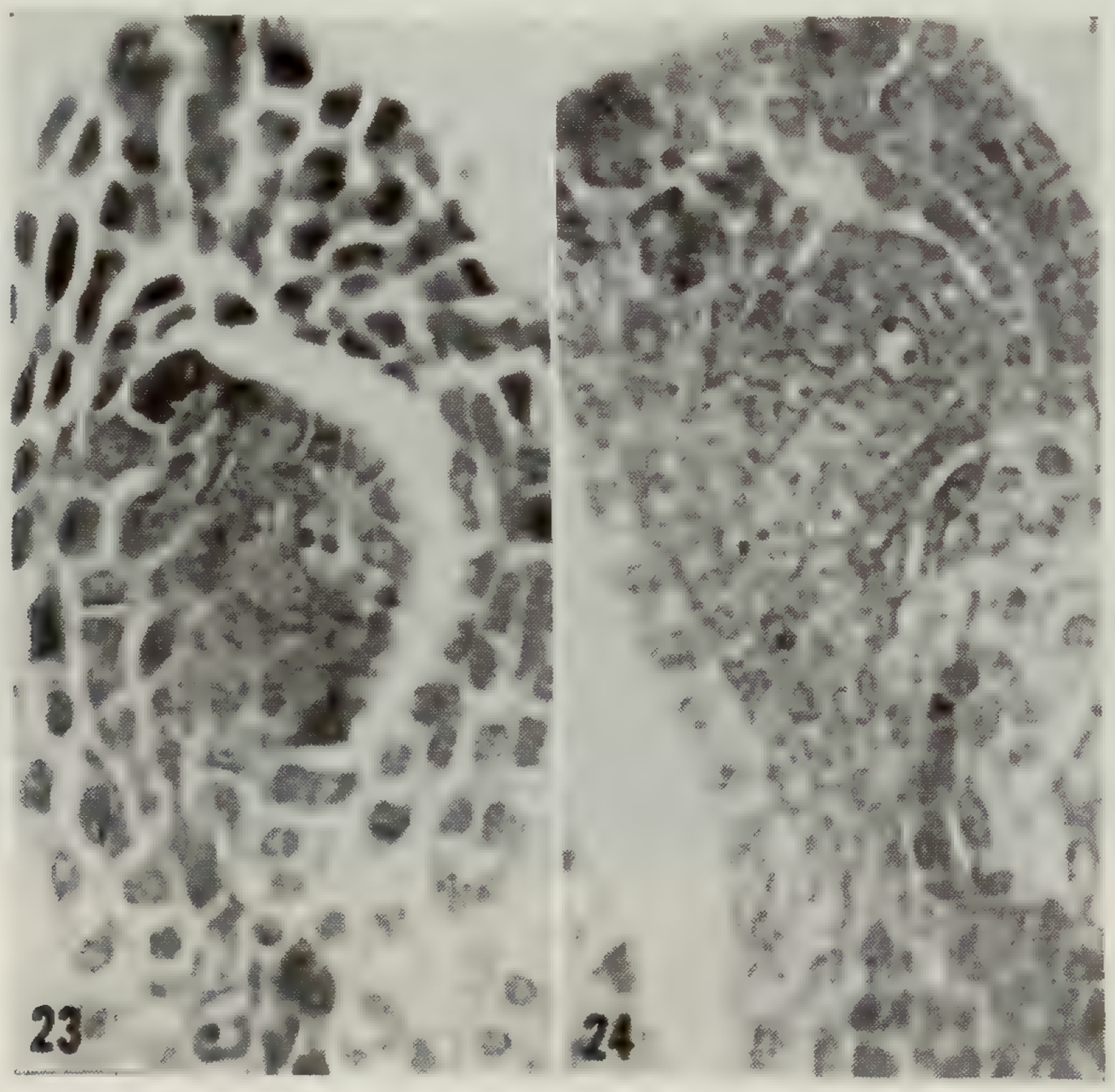


4-nucleate sac composed of an egg nucleus, polar nucleus (2n) and two synergids. Fig. 18. Mature 5-nucleate sac composed of an egg nucleus, polar nucleus (2n; possibly 4n) and three antipodals. Figs. 19–20. (From adjacent sections) Mature 6-nucleate sac composed of an egg nucleus, polar nucleus (4n upon fusion) and three antipodals. Figs. 21–22. (From adjacent sections) Mature sac with antipodal cluster; found only in *E. curvula*. Figs. 11–13, approximately 900×. Figs. 14–17, approximately 250×. Figs. 18–22, approximately 150×.

(Fig. 18). More commonly (67 per cent), mature sacs were composed of an egg, two polar nuclei and three antipodals (Figs. 19–20 and 21–22). *E. curvula* was the only species in which antipodals divided further to exceed the usual number (Fig. 22). Synergids were not observed in the 5- and 6-nucleate sacs, and conversely, antipodals were not found in 4-nucleate sacs.

The fact that meiosis apparently does not occur is of more importance than the later stages of sac development. Over five thousand ovules were examined at stages in which meiosis, tetrads of megaspores or megaspore disintegration would commonly be observed in a normal species such as *E. superba*. Yet not one example of either of these three phases of megagametogenesis was noted. Unusual activity of nucellar cells which would suggest apospory was also absent. This evidence strongly suggests diplospory of the *Antennaria* type as described by Gustafsson (6). Although the mature sac is unique in that most are 6-nucleate, the earlier phases of development are similar to those of *Eupatorium glandulosum* H.B.K. (6).

A small number of ovules, in the early stages of gametophytic development, were observed to have two nuclei of equal size (Figs. 23 and 24). Cell walls or membranes between the nuclei in any of these ovules would be suggestive of embryo-sac formation by means of restitution nuclei.



Figs. 23–24, *Eragrostis*. Photomicrographs of ovules (longitudinal sections) showing 2-nucleate sacs developing quickly after differentiation of the archesporial cell. Figs. 23–24, approximately 900×.

However, since they were completely absent, it is postulated that these are actually 2-nucleate sacs, having passed quickly through the earlier stages of development because of some abnormal physiological condition. These ovules probably abort before reaching maturity.

DISCUSSION

Cytological data obtained in this study indicate that *E. superba* reproduces sexually. Megasporogenesis and embryo-sac development is completely normal, the end result being a gametophyte of the typical "*Polygonum* type." Supporting these cytological data are results from seed-set studies[4] in which only fourteen seed per inflorescence were set under space isolation, as compared to six hundred seventy four when allowed to open-pollinate. In addition, a space-planted progeny test growing at Renner displays considerable variability for such characters as inflorescence type, growth habit, rust resistance, leafiness and plant height. Therefore, on the basis of both cytological and field studies, it is postulated that *E. superba* is sexual and cross-pollinated.

On the other hand, *E. chloromelas*, *E. curvula* and *E. Lehmanniana* are considered to reproduce apomictically. The mechanism appears to be diplospory with an *Antennaria* type embryo-sac resulting from two or more mitotic divisions of the megaspore mother cell. Since megaspores and disintegration of megaspores were readily detected in the sexual species, *E. superba*, the absence of these developmental phases in ovules of these species is strong evidence supporting the apomictic concept.

Mature sacs were 4-, 5- or 6-nucleate, the 4-nucleate sacs being least common.

Pollination appears to be necessary for seed formation since embryos did not develop until several hours after anthesis. Field studies indicate that seed-set by plants under space isolation is equally as good as when plants are allowed to open-pollinate. Spaced plants from open-pollinated seed of these three species yielded no recognizable variants. Although the possibility of sexual reproduction with the species being completely self-pollinated can not be precluded, it is postulated on the basis of extensive cytological observation that the reproductive mechanism is diplospory followed by pseudogamy.

The results of this study suggest that there could be some merit to grouping those strains considered to be *E. chloromelas* under the species *E. curvula* as has been done previously (5). In this same light, *E. Lehmanniana* would have to be considered a variety or form of *E. curvula*. The

---

[4] Unpublished data, Wright and Streetman.

author has observed plants considered to be *E. curvula* with inflorescences similar to both those of *E. Lehmanniana* and *E. chloromelas*. Within a given form, however, all plants remain true to type. This is only one of many characters which seem to provide definite links between the three species. Nevertheless, recognizing that there are many intermediate forms making it difficult to demarcate these species, it is felt that taxonomic revision of these species has been premature. Studies of chromosome numbers and chromosome pairing during meiosis would aid in delimiting these species. Since *E. superba* is cross-pollinated and almost completely self-sterile, attempts are being made to produce interspecific hybrids using the three apomictic species as male parents. In the event hybrid production is successful, chromosome association of these plants would be of utmost interest. Certainly more detailed studies are also needed on the anatomy and morphology of this very important genus.

SUMMARY

Fifteen plants of three *E. superba* accessions were studied for mode of reproduction. Megasporogenesis and embryo-sac development was completely normal resulting in a megagametophyte of the "*Polygonum* type." The results of combined cytological and field data indicate sexual reproduction and cross-pollination.

Megasporogenesis and embryo-sac development of *E. chloromelas*, *E. curvula* and *E. Lehmanniana* deviates from normal soon after differentiation of the archesporial cell. Mitotic divisions of the megaspore mother cell result in 4-, 5- or 6-nucleate embryo-sacs. Apomictic reproduction, diplospory followed by pseudogamy, is postulated for these three species.

LITERATURE CITED

1. Anderson, D., Hamilton, L. P., Reynolds, H. G., and Humphrey, R. R. Reseeding Desert Grassland Ranges in Southern Arizona. Ariz. Agr. Exp. Station Bulletin 249. 32 pp. 1957.

2. Brown, W. V., and Emery, W. H. P. Apomixis in the Gramineae: Panicoideae. Am. Jour. Bot. 45: 253–263. 1958.

3. Carnahan, H. L., and Hill, H. D. Cytology and Genetics of Forage Grasses. Bot. Rev. 27: 1–162. 1961.

4. Crider, F. J. Three Introduced Lovegrasses for Soil Conservation. U. S. Dept. Agr. Circ. No. 730. 1945.

5. de Winter, B. *Eragrostis* Beauv. The Grasses and Pastures of South Africa. Central News Agency. Union of South Africa. 132–184. 1955.

6. Gustafsson, A. Apomixis in Higher Plants. Lund. (Sweden) Hakan Oblssons Boktryekeri. 1947.

7. Hanson, A. A., and Carnahan, H. L. Breeding Perennial Forage Grasses. U. S. Dept. Agr. Tech. Bulletin 1145. 116 pp. 1956.

8. Johansen, D. A. Plant Microtechnique. McGraw-Hill. New York. 1940.

9. Jones, M. D., and Brown, J. G. Pollination Cycles of Some Grasses in Oklahoma. Agron. Jour. 43: 218–222. 1951.

10. Maheshwari, P. An Introduction to the Embryology of the Angiosperms. McGraw-Hill. New York. 1950.

11. Myers, W. M. Cytology and Genetics of Forage Grasses. Bot. Rev. 13: 319 367, 369–421. 1947.

12. Stover, E. L. The Embryo-Sac of *Eragrostis cilianensis* (All.) Link. Ohio Jour. Sci. 37: 172–184. 1937.

REPRODUCTION OF THE LOVEGRASSES, THE GENUS ERAGROSTIS—II. E. BICOLOR NEES, E. PLANA NEES, E. INTERMEDIA HITCHC. AND E. OBTUSA MUNRO[1]

L. J. Streetman[2]

The writer is currently engaged in an interspecific hybridization program involving several species of *Eragrostis*. The primary objective of this program is to elucidate the taxonomy of this complex genus. Only meager amounts of basic research pertaining to *Eragrostis* may be found in the literature, therefore, comprehensive investigations of mode of reproduction and cytology are integral phases of the over-all program.

The first of this series of papers (6) gave detailed accounts of megasporogensis and embryo-sac development of four of the more important *Eragrostis* species. Since the initial study revealed three species with an apomictic mode of reproduction, investigation of other species being considered for use in the hybridization program was desirable. Two of the species included in this study are diploid (*E. bicolor* Nees, *E. plana* Nees; 2n = 20) and two are polyploid (*E. intermedia* Hitchc., *E. obtusa* Munro; 2n = 40). Gametophytic apomixis rarely occurs in diploid organisms (3, 5), therefore, the diploids should serve as a basis for interpretation of female gametophyte development of other *Eragrostis* species.

E. bicolor is an introduced South African bunchgrass which forms a mat of curly basal leaves that readily distinguishes it from most other *Eragrostis* species. It is a slow growing perennial that produces a small volume of high quality forage. It appears to be adapted to blue grama grass areas with fifteen inches or more rainfall and withstands minimum temperatures of ten degrees to fifteen degrees F. (1).

E. plana is a perennial bunchgrass with strongly compressed, often spreading and fan-shaped leaf-sheaths. It is a very distinct species easily recognized by a long narrow pyramidal inflorescence, very short unequal

---

[1] Paper No. 11 from the Hoblitzelle Agricultural Laboratory, Texas Research Foundation. This study was supported in part by the Amon G. Carter Foundation, Fort Worth, Texas.

[2] Cytogeneticist, Hoblitzelle Agricultural Laboratory, Texas Research Foundation. Acknowledgment is made to Neal Wright, Crops Research Division, Agricultural Research Service, U. S. Department of Agriculture, Tucson, Arizona, for providing plant material and contributing to the planning of this investigation.

glumes and laterally compressed, bumpy grains (2). A native of South Africa, it has shown little promise for reseeding depleted native rangelands in the United States. However, preliminary studies indicate that this species may have some potential in the more humid areas of the Southwest.

E. intermedia is one of three *Eragrostis* species native to the United States that has much value as a forage plant. It is found on the dry sandy prairies of some southern states and in the blue grama grass areas of Texas, New Mexico and Arizona. It is a perennial bunchgrass with erect culms that grow two and a half to three feet in height. Although a nutritious forage producer, difficulty of establishment under range conditions has limited its use for reseeding depleted areas.

E. obtusa is a perennial bunchgrass that grows one and a half to two feet tall. This grass, like the species described above, was introduced from South Africa. The plant has numerous slender stems that may be erect or sprawling. A low volume forage producer, this species appears to have little agricultural value in the United States.

MATERIALS AND METHODS

One accession was selected for each of the four species in this investigation. Five plants from each accession were established in three gallon clay pots in the greenhouse. Voucher specimens of each species have been placed in the herbaria at Texas Research Foundation and the University of Arizona.

The techniques for collecting, embedding, sectioning and staining of ovaries observed in this investigation were essentially the same as those described in detail in the first report of this series (6). It was necessary, however, to dissect ovaries of *E. obtusa* from the spikelet because difficulty was encountered when sectioning through the lemma and palea. In addition, ovaries of *E. bicolor* sectioned at six microns were suitable for both megasporogenesis and embryo-sac development. Approximately two hundred ovaries were studied from each species.

Photomicrographs were taken using an AO Spencer Model 682B 4 × 5 Photomicrographic camera mounted on an AO Spencer research microscope. Best results were obtained using Kodak Plus X film.

RESULTS

Eragrostis bicolor Nees

Development of the female gametophyte begins with the differentiation of an archesporial cell from a hypodermal cell of the nucellus. Integument

development is well advanced at this time (Fig. 25). Meiosis then proceeds without significant enlargement of the megaspore mother cell or nucellar cavity (Fig. 26). A number of ovaries were observed with the megaspore mother cell at metaphase I, but clumping of the small chromosomes prevented accurate counts. Two nuclear divisions result in a linear tetrad of megaspores. The chalazal megaspore remains functional while the three megaspores nearest the micropyle disintegrate and gradually disappear (Fig. 27). The inner integument has developed to form the micropyle but the outer integument is somewhat slower developing, finally reaching the micropylar region at the 4-nucleate stage.

The megaspore enlarges and then undergoes three successive mitotic divisions. After the first division, the daughter nuclei migrate to opposite ends of the cell. Rather than aggregating around each nuclei, thus leaving a large vacuole in the center of the sac cavity, the cytoplasm remains dense throughout the cell (Fig. 28). The second and third divisions result in a 4-nucleate (Fig. 29) and finally an 8-nucleate embryo-sac. Remains of the non-functional megaspores are still visible through the 4-nucleate stage as a dark stained mass near the micropyle (Figs. 28, 29). Once the 8-nucleate stage is reached, the nuclei quickly organize to form a mature female gametophyte consisting of an egg, two polar nuclei, two synergids and three antipodals. The synergids usually disintegrate soon after the mature embryo-sac is complete (Fig. 30). The embryo-sac is typical of the monosporic 8-nucleate "*Polygonum* type," as described by Maheshwari (4).

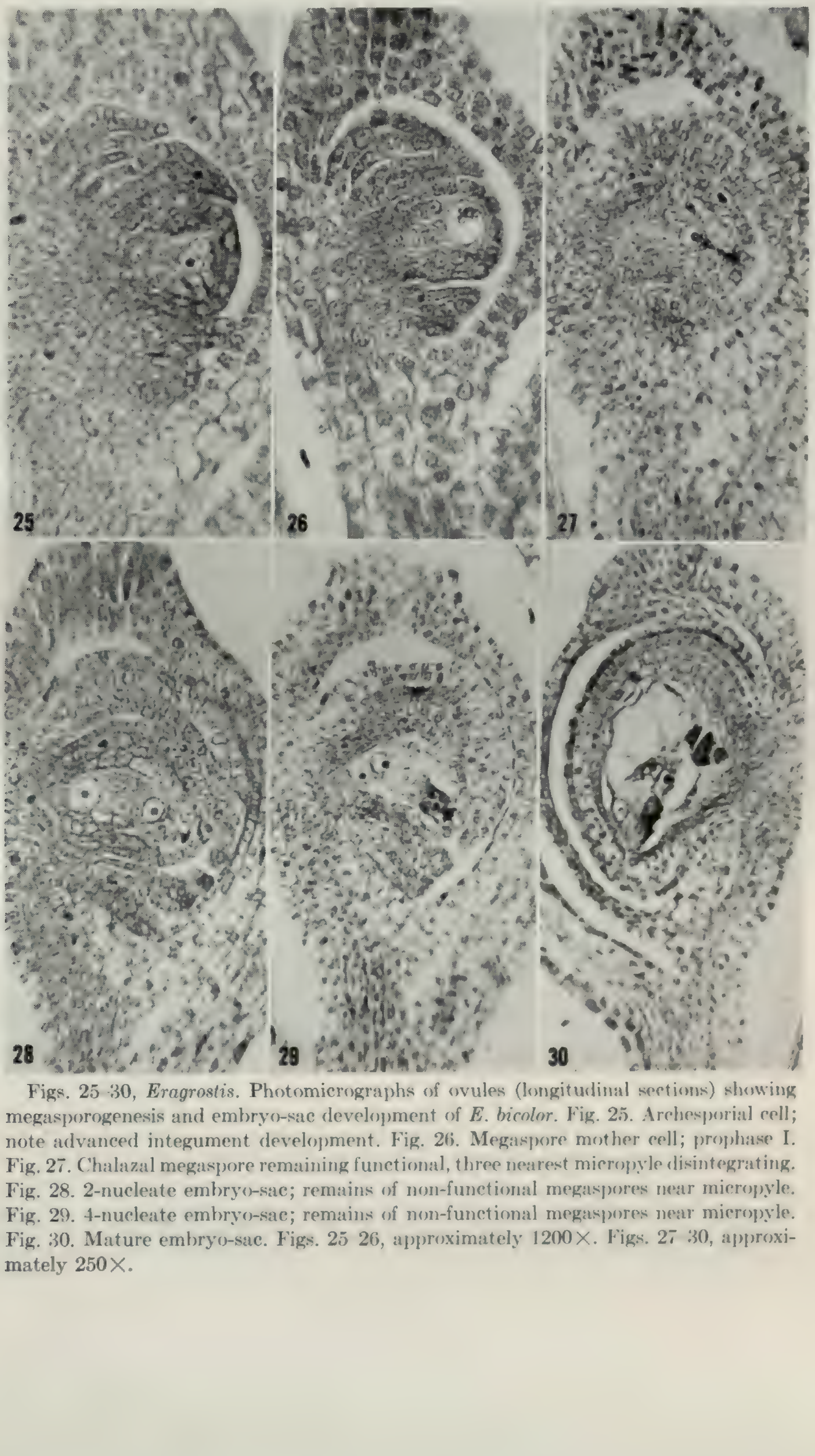
Three notable differences in the embryo-sac of this species and that of *E. superba* Peyr. (6) are: (a), the egg is usually oriented near the outer edge of the sac cavity, adjacent to nucellar tissue and just above the micropyle rather than directly over the synergids; (b), the polar nuclei do not fuse until about twelve hours after anthesis; and (c), the antipodal nuclei formed cells instead of remaining free nuclear.

Unusual activity of nucellar cells was not apparent and proembryo and endosperm development was not observed until twelve to eighteen hours after anthesis, thus fertilization appears to be necessary and of the normal type.

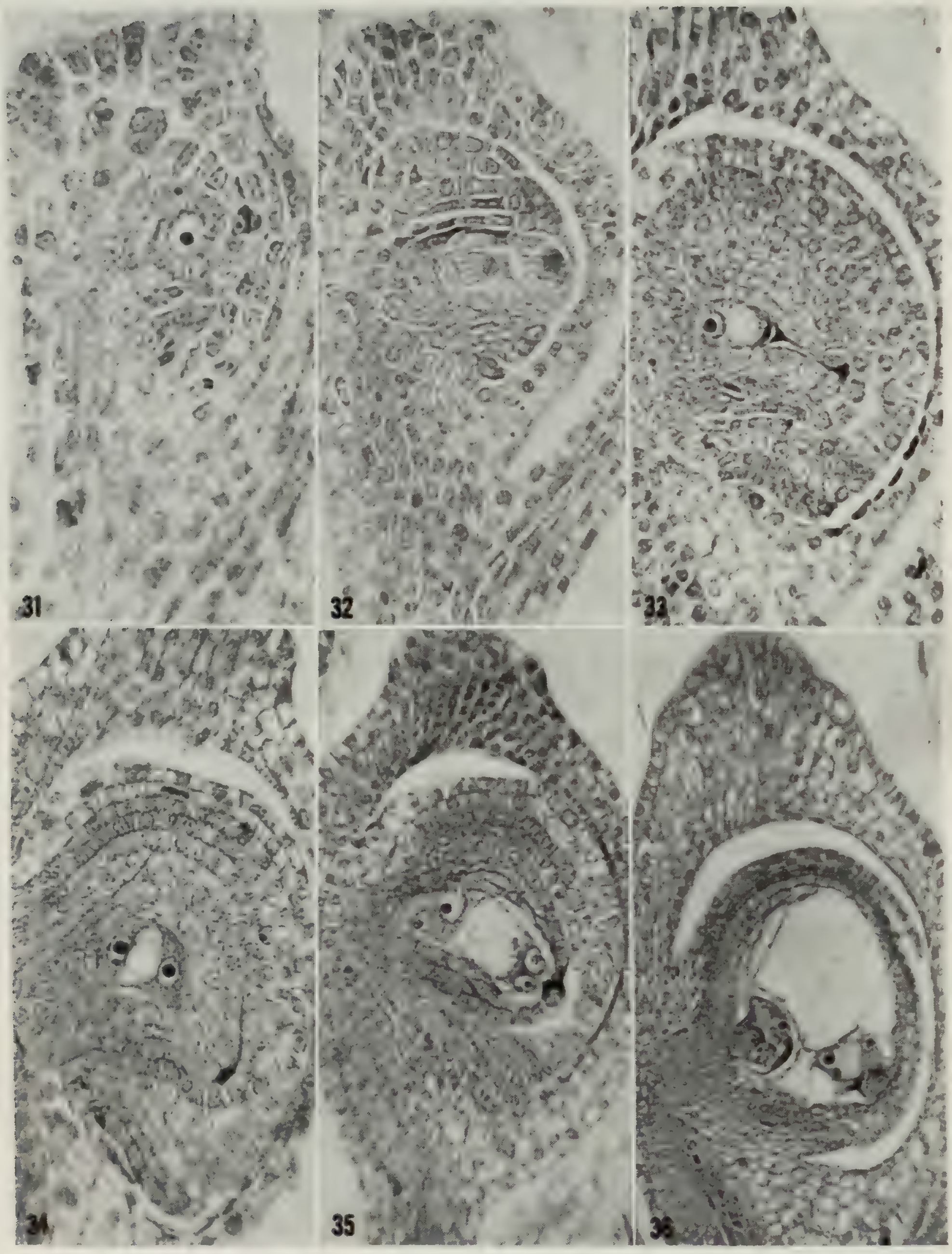
Eragrostis plana Nees

Megasporogenesis and embryo-sac development of this species (Figs. 31–36) are basically the same as described for *E. bicolor*. There are, however, some differences which appear constant and are noteworthy.

The archesporial cell differentiates much earlier and is more prominent in relation to surrounding tissues as may be observed by comparing Figs. 25 and 31. Megasporogenesis is nearly complete when integument growth equals that found in *E. bicolor* at the time of archesporial cell differenti-



Figs. 25–30, *Eragrostis*. Photomicrographs of ovules (longitudinal sections) showing megasporogenesis and embryo-sac development of *E. bicolor*. Fig. 25. Archesporial cell; note advanced integument development. Fig. 26. Megaspore mother cell; prophase I. Fig. 27. Chalazal megaspore remaining functional, three nearest micropyle disintegrating. Fig. 28. 2-nucleate embryo-sac; remains of non-functional megaspores near micropyle. Fig. 29. 4-nucleate embryo-sac; remains of non-functional megaspores near micropyle. Fig. 30. Mature embryo-sac. Figs. 25–26, approximately 1200×. Figs. 27–30, approximately 250×.



Figs. 31–36, *Eragrostis*. Photomicrographs of ovules (longitudinal sections) showing megasporogenesis and embryo-sac development in *E. plana*. Fig. 31. Archesporial cell. Fig. 32. Megaspore mother cell; metaphase II. Fig. 33. Functional megaspore mother cell; three nearest micropyle disintegrating. Fig. 34. 2-nucleate embryo-sac; remains of nonfunctional megaspores. Fig. 35. 4-nucleate embryo-sac; remains of non-functional megaspores. Fig. 36. Mature embryo-sac. Figs. 31–32, approximately 1200×. Figs. 33–36, approximately 250×.

ation (Figs. 25, 33). Vacuolization of the embryo-sac (Figs. 33, 34, 35, 36) is somewhat more pronounced in this species and the antipodal nuclei continue to divide, forming a cluster of cells which is located closer to the micropyle than typical of *E. bicolor* (Figs. 30, 36).

Approximately eighteen hours elapsed between anthesis and onset of proembryo or endosperm development, and as with *E. bicolor*, fertilization apparently is necessary and of the normal type.

Eragrostis intermedia Hitchc.

Female gametophyte development of this species (Figs. 37–42) proceeds in the manner as described for *E. bicolor*.

Archesporial cell differentiation occurs earlier than in *E. bicolor* (Figs. 25, 37) and is similar to *E. plana*.

Remains of disintegrated megaspores were not found in 4-nucleate sacs of this species (Fig. 41) as contrasted to being common at this stage in both *E. bicolor* and *E. plana*.

The antipodal nuclei of *E. intermedia* divide a number of times resulting in a cluster of cells in the chalazal region of the embryo-sac (Fig. 42).

Perhaps the most notable difference between the gametophyte of *E. intermedia* and that of the previously described species is that the polar nuclei fuse by the time of anthesis (Fig. 42) rather than remaining separate until fertilization occurs.

Abnormalities such as unusual activity of nucellar cells and proembryo development before fertilization were not detected during gametogenesis of this species. Some twelve hours lapsed between anthesis and initiation of embryogenesis.

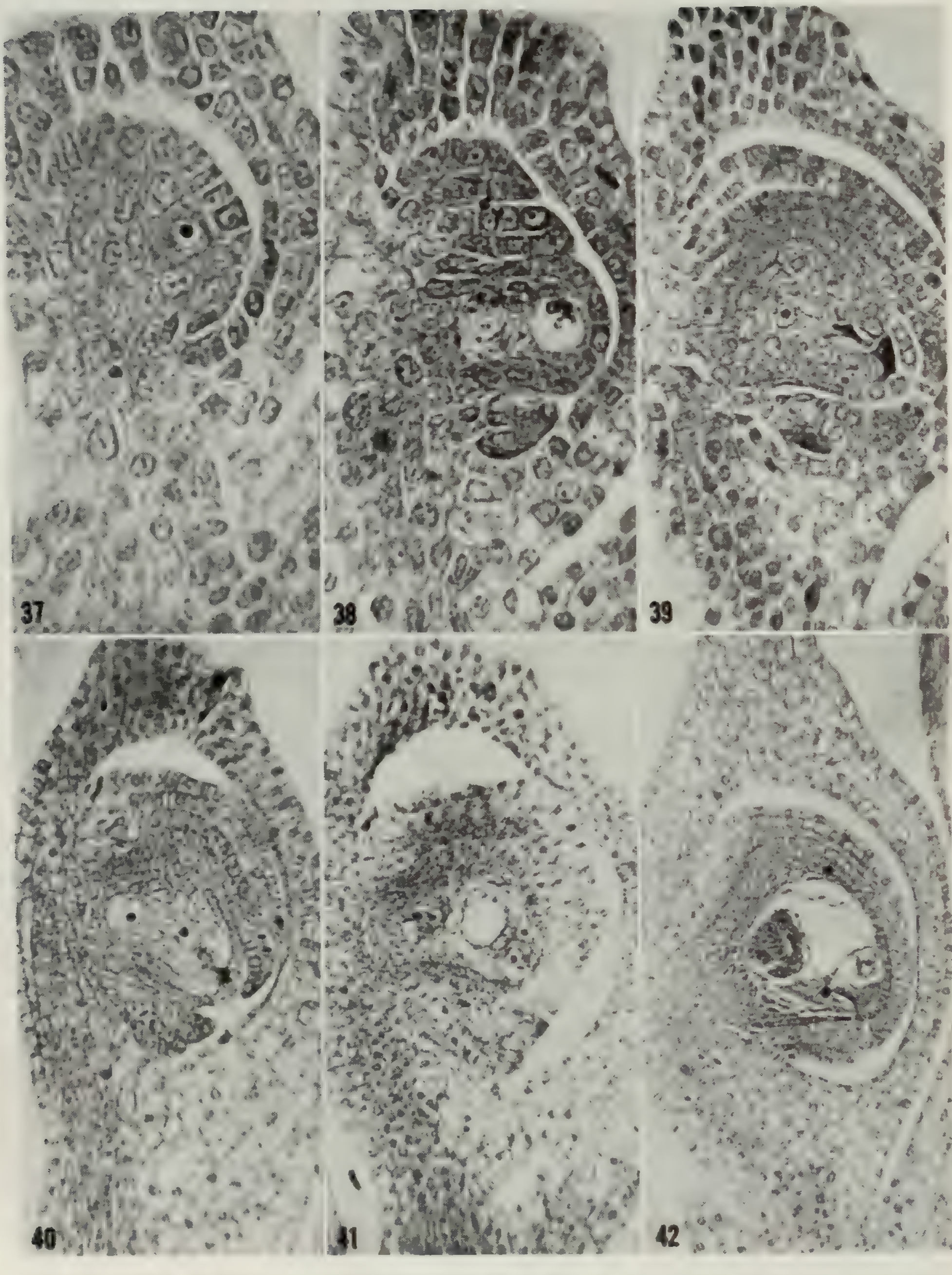
Eragrostis obtusa Munro

Megasporogenesis and embryo-sac development of this species (Figs. 43–48) are essentially the same as described for the above species.

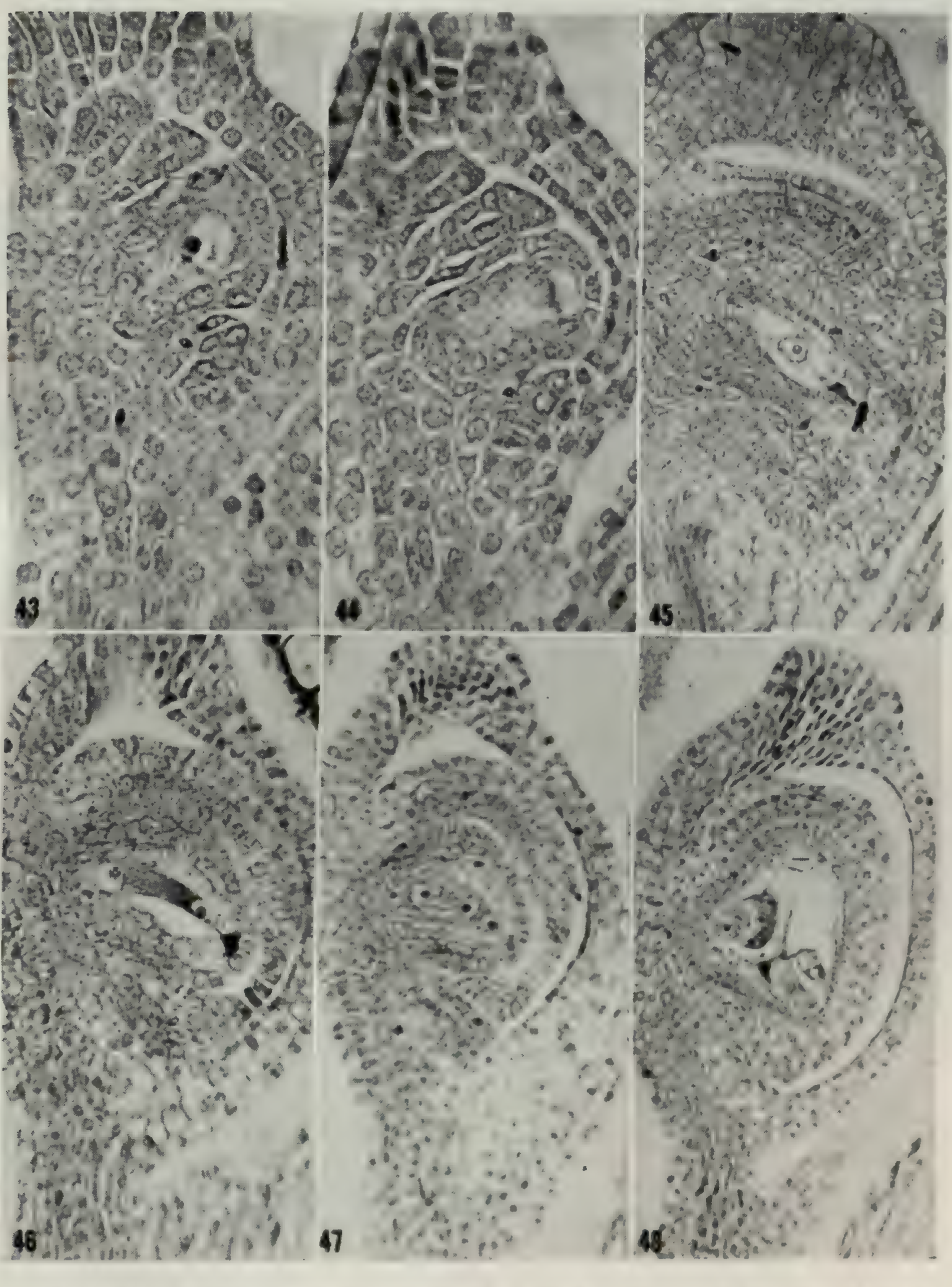
As in *E. intermedia*, the polar nuclei fuse by time of anthesis (Fig 48), whereas in *E. bicolor* and *E. plana* fusion does not occur until time of fertilization. Proembryo development was not observed until twelve hours after anthesis, suggesting that fertilization is necessary and of the normal type.

DISCUSSION

Cytological observations of megasporogenesis and embryo-sac development indicate normal sexual reproduction in the four *Eragrostis* species investigated. Gametogenesis begins with the differentiation of an archesporial cell from a hypodermal cell of the nucellus. This archesporial cell



Figs. 37–42, *Eragrostis*. Photomicrographs of ovules (longitudinal sections) showing megasporogenesis and embryo-sac development of *E. intermedia*. Fig. 37. Archesporial cell. Fig. 38. Megaspore mother cell; prophase I. Fig. 39. Functional megaspore; three nearest micropyle disintegrating. Fig. 40. 2-nucleate embryo-sac with remains of disintegrated megaspores. Fig. 41. 4-nucleate embryo-sac. Fig. 42. Mature embryo-sac. Figs. 37–38, approximately 1200×. Figs. 39–42, approximately 250×.



Figs. 43–48, *Eragrostis*. Photomicrographs of ovules (longitudinal sections) showing megasporogenesis and embryo-sac development in *E. obtusa*. Fig. 43. Archesporial cell. Fig. 44. Megaspore mother cell; metaphase I. Fig. 45. Functional megaspore; three nearest micropyle disintegrating. Fig. 46. 2-nucleate embryo-sac with remains of disintegrated megaspores. Fig. 47. 4-nucleate embryo-sac. Fig. 48. Mature embryo-sac. Figs. 43–44, approximately 1200×. Figs. 45–48, approximately 250×.

eventually gives rise to a monosporic 8-nucleate embryo-sac. Typical meiotic division figures were observed frequently and the formation of tetrads of megaspores leaves little doubt that the species reproduce sexually. Additional evidence of sexual reproduction is afforded by the absence of proembryo and endosperm development until several hours after anthesis.

Spaced plants grown in a nursery at Renner from open-pollinated seed were highly uniform, indicating that these species are largely self-pollinated.

SUMMARY

Four *Eragrostis* species were studied cytologically to determine their mode of reproduction. Gametophyte development was normal, the end result being a monosporic 8-nucleate embryo-sac. Proembryo and endosperm development occurred twelve to eighteen hours after anthesis, indicating the necessity of pollination. These cytological data suggest that reproduction is by normal sexual process. Uniformity among spaced plants indicates each species is largely self-pollinated.

LITERATURE CITED

1. Anderson, D., Hamilton, L. P., Reynolds, H. G. and Humphrey, R. R. Reseeding Desert Grassland Ranges. Ariz. Agr. Exp. Station Bulletin 249. 32 pp. 1957.
2. de Winter, B. *Eragrostis* Beauv. The Grasses and Pastures of South Africa. Central News Agency. Union of South Africa. 132–184. 1955.
3. Gustafsson, A. Apomixis in Higher Plants. Lund. (Sweden) Hakan Oblssons Boktryekeri. 1947.
4. Maheshwari, P. An Introduction to the Embryology of the Angiosperms. McGraw-Hill. New York. 1950.
5. Stebbins, Jr., G. L. Variation and Evolution in Plants. Columbia University Press. New York. 1951.
6. Streetman, L. J. Reproduction of the Lovegrasses, the Genus *Eragrostis*—I. *E. chloromelas* Steud., *E. curvula* (Schrad.) Nees, *E. Lehmanniana* Nees and *E. superba* Peyr. Wrightia 3: 41–51. 1963.

VOLUME 3 MARCH, 1963 NUMBER 4

WRIGHTIA

A BOTANICAL JOURNAL

CONTENTS

New Species of Parathesis (Myrsinaceae).
By Cyrus Longworth Lundell.....61

PUBLISHED BY
TEXAS RESEARCH FOUNDATION
RENNER, TEXAS

WRIGHTIA

WRIGHTIA, a botanical journal, is a publication of Texas Research Foundation. The contributions are by staff members and collaborators.

Each volume will contain a series of numbers, to be issued at irregular intervals. The subscription price for Volume 3 is $12.00, postpaid.

VOLUME 3, NUMBER 4
ISSUED MARCH 15, 1963

Printed in the U.S.A.
Etheridge Printing Company
Dallas, Texas

WRIGHTIA

VOLUME 3 MARCH, 1963 NUMBER 4

NEW SPECIES OF PARATHESIS (MYRSINACEAE)

CYRUS LONGWOTRH LUNDELL

A revision of the genus *Parathesis* has been undertaken. Types and authentic material of all species, including Swartz, Mez, Hemsley, and Oersted types from Stockholm, Copenhagen and Kew, have been borrowed, which makes possible a thorough-going study of this tedious group.

An examination of the type of *P. serrulata* (Sw.) Mez reveals that our concept of this key species must be revised. It is a shrub of Hispaniola, apparently known outside of that island only from a single not very typical Cuban specimen. Evidently Dr. Carl Mez, in the preparation of his monograph of the genus (Pflanzenreich IV. 236: 173–181. 1902.), did not see the Swartz type, for he misinterpreted this distinctive species. The application of the name to continental collections has resulted in great confusion, making the epithet almost meaningless.

Grateful acknowledgment is made to the curators of European and major American herbaria for their cooperation in making types and other collections available on loan.

Parathesis belizensis Lundell, sp. nov.

Arbor parva, ramuli crassiusculi, rufo-tomentosi; folia petiolis usque ad 1 cm. longis stipitata, oblongo-elliptica vel lanceolato-elliptica, 10–20 cm. longa, 4–6.5 cm. lata, apice subabrupte acuminata, basi acuta, chartacea, minute denticulata, supra glabra, subtus stellato-pubescentia; inflorescentia terminalis, paniculata, 12 cm. longa, rufo-tomentella, pedicellis 2–4 mm. longis; flores corymbosi, ante anthesin usque ad 4.5 mm. longi, parce hirtello-tomentelli et papillosi; sepala anguste traingularia, usque ad 1.5 mm. longa, acuminata; petala lineari-lanceolata, 4.5 mm. longa; stamina ca. 3 mm. longa; filamenta ca. 1.5 mm. longa; antherae erectae, elliptico-lanceolatae, ca. 2.2 mm. longae, acutiusculae, apice parce barbatae, dorso area punctata praeditae; ovarium parce hirtellum; ovula 6, uniseriata.

BRITISH HONDURAS: Stann Creek District, Middlesex, in high ridge, May 3, 1939, *Percy H. Gentle 2779* (type, MICH; photo, LL), a small tree.

The flowers, with barbate anthers, suggest a relationship of *P. belizensis* to *P. Eggersiana* Mez of Ecuador. But the leaves of the latter are distinctly broader above the middle, and the stellate hairs on the undersurface are appressed and obscurely bizonal. In its very short pedicels *P. belizensis* differs from *P. Eggersiana* and also from *P. chiapensis* Fernald, which has similar features. *P. chiapensis* has much larger foliaceous sepals, finer stellate hairs on branchlets and undersurface of leaves, much larger flowers, and nine ovules.

Parathesis brevipes Lundell, sp. nov.

Frutex, ramuli crassiusculi, novelli adpresse ferrugineo-tomentelli; folia petiolis 1–2 cm. longis stipitata, oblanceolata, oblanceolato-elliptica vel elliptico-oblonga, 12–27 cm. longa, 4–8.5 cm. lata, apice subabrupte acuminata, basi acuminata, crenulata vel subintegra, repanda, pellucido-punctata, membranacea, subtus novella peradpresse et minute stellato-pubescentia; inflorescentia terminalis, tripinnatim paniculata, 7.5–27 cm. longa, minute stellato-tomentella, pedicellis 2.5–4 mm. longis, papilloso-puberulis; flores corymboso-racemosi, ante anthesin usque ad 4.5 mm. longi, minute ferrugineo-tomentelli; sepala ovato-triangularia, pellucido-punctata, 1–1.4 mm. longa, acuminata; petala lineari-lanceolata, usque ad 4.5 mm. longa, lineato-picta; stamina ca. 2.5 mm. longa; filamenta ca. 1.2 mm. longa; antherae erectae, ovatae, ca. 2 mm. longae, acutiusculae, dorso area punctata praeditae; ovarium ovoideum, stellato-tomentellum, apice hirtellum; ovula 5–7, raro 4 vel 8, uniseriata; fructus depresso-globosi, usque ad 1 cm. diam.

MEXICO: Hidalgo, between Chapulhuacan and Tamazunchale, in ravine on mountainside, km. 340 of highway, Aug. 20, 1943, *C. L. Lundell & Amelia A. Lundell 12419* (type, LL; isotypes, MICH, US), slender arborescent shrub, 4 ft. high; inflorescence and flowers rose-red; fruits depressed-globose, black. San Luis Potosi, Tamazunchale, in wet second growth on hillside, July, 1937, *Lundell & Lundell 7136* (LL, MICH, NY); Palitla, near Tamazunchale, in forest, July 13, 1943, *C. L. Lundell 12227* (LL, MICH, NY, US), "*uakamhopuli.*"

P. brevipes, most abundantly collected in the wet forests of eastern San Luis Potosi, belongs in the *P. Donnell-Smithii* Mez group with corymbose-racemose flowers. The pellucid glands of the perianth and the orange-punctate anthers are to be noted. The short pedicels, fewer-flowered racemes, and more abundant persistent pubescence set it apart immediately from *P. Donnell-Smithii*, a species of Guatemala.

Parathesis columnaris Lundell, sp. nov.

Frutex vel arbor parva, ramuli rufo-tomentosi; folia petiolis usque ad

2 cm. longis stipitata, oblanceolata, 10–18 cm. longa, 2.5–5 cm. lata, apice subabrupte acuminata, basi attenuata et acuminata, chartacea, integra vel subintegra, supra glabra, subtus novella stellato-pubescentia; inflorescentia terminalis, paniculata, usque ad 20 cm. longa, rufo-tomentella, pedicellis 4–9 mm. longis; flores corymbosi, ante anthesin usque ad 7 mm. longi, papillosi et parce rufo-lepidoti; sepala anguste triangularia, 1–1.4 mm. longa, acuminata, lineato-picta; petala lineari-lanceolata, usque ad 7 mm. longa, acuminata, lineato-picta, intus villosa; stamina 3–4.5 mm. longa; filamenta 1.3–1.7 mm. longa, punctata; antherae erectae, linearilanceolatae, 2.3–3.5 mm. longae, acutiusculae, dorso area punctata praeditae; ovarium hirtellum, parce hirtellum vel glabrum; ovula 7 vel 8, uniseriata.

GUATEMALA: Dept. Quezaltenango, Finca Pirineos, lower south-facing slopes of Volcan Santa Maria, between Santa Maria de Jesus and Calahauche, in deep forest, alt. 1300–1500 m., Dec. 31, 1939, *Julian A. Steyermark 33205* (type, F; photo, LL), shrub 20 ft. tall, corolla tinged with pink.

The species is represented by a number of collections from Guatemala and Chiapas, and it ranges south into El Salvador.

The thin slender essentially entire leaves with fine red stellate pubescence on undersurface, long slender flower buds, very slender erect anthers forming a column, long slender pedicels, ovary glabrous or nearly so, and blood-red matted tomentum consisting of sordid multibranched hairs are characteristics by which *P. columnaris* may be recognized. No other species has the peculiar waxy appearing tomentum with slender red hairs irregularly branched to base. The nearest species appears to be *P. ferruginea* Lundell, which has similar long slender anthers, but fewer ovules and longer sepals.

Parathesis elliptica Lundell, sp. nov.

Frutex, ramuli crassiusculi, novelli peradpresse stellato-lepidoti; folia petiolis 8–15 mm. longis stipitata, elliptica, 7.5–15 cm. longa, 3–6.5 cm. lata, apice subabrupte acuminata vel acuminata, basi acutiuscula, margine crenulato-serrulata, membranaceo-chartacea, subtus novella adpresse stellato-tomentosa; inflorescentia terminalis, tripinnatim paniculata, usque ad 20 cm. longa, parce stellato-lepidota, pedicellis usque ad 8 mm. longis, papilloso-puberulis; flores subcorymbosi, minute ferrugineo-tomentelli, ante anthesin usque ad 4.5 mm. longi; sepala triangularia, 1–1.2 mm. longa, acuta, punctata; petala anguste lanceolata, usque ad 5 mm. longa, lineato-picta, intus villoso-papillosa; stamina ca. 2.8 mm. longa; filamenta usque ad 1.5 mm. longa; antherae erectae, lanceolato-triangulariae, 1.8–2 mm. longae, apice acutiusculae, dorso area parce nigro-punctata praeditae; ovarium tomentellum; ovula 6, uniseriata.

MEXICO: Veracruz, Orizaba, April, 1855, *Botteri 910* (type, F; isotype, K; fragment & photo, LL).

Known only from the type collection, *P. elliptica* is unique in several features, notably in having a pubescent style tomentose basally, petals thinly villous-papillose over entire surface within, anthers submedially attached and black-punctate dorsally with only a few small glands. Its large spreading inflorescence and elliptic leaves further distinguish it. Although the elongation of the floriferous rachis is scarcely evident, and not conspicuous as in *P. brevipes* Lundell and *P. Donnell-Smithii* Mez, the flowers being essentially subcorymbose, the affinity of *P. elliptica* appears to be with this group.

Parathesis emarginata Lundell, sp. nov.

Arbor, ramuli crassiusculi, novelli peradpresse tomentelli; folia petiolis 1–2 cm. longis stipitata, elliptica vel obovato-elliptica, 10.5–19 cm. longa, 4–7 cm. lata, apice abrupte acuminata, basi acuta, membranacea, margine obscure crenulata, repanda, supra glabra, subtus novella adpresse stellato-pubescentia; inflorescentia terminalis, tripinnatim paniculata, papilloso-puberula et parce stellato-tomentella, pedicellis 2.5–5 mm. longis; flores subcorymbosi, ante anthesin ca. 5 mm. longi, papilloso-puberuli; sepala ovato-triangularia, ca. 1 mm. longa, acuta, nigro-punctata; petala 5.5 mm. longa, lineato-picta; stamina ca. 3.8 mm. longa; filamenta 1.8–2 mm. longa, crassa; antherae erectae, oblongo-lanceolatae, 1.8–2.2 mm. longae, apice emarginatae, dorso area nigro-punctata praeditae; ovarium ovoideum, apice tomentosum; ovula 6–8, subglobosa, minuta, uniseriata.

COLOMBIA: Santa Marta, Cacagualeto, common in deep wooded valleys, especially near streams, alt. ca. 500 m., May 15, 1898–1901, *Herbert H. Smith 444* (type, F; isotypes, LL, MICH, NY, US), flowers in May and June.

The emarginate anthers grooved dorsally at apex and often bearing a tuft of hairs ventrally, the dense papillose-puberulent indument of the flowers, the small sepals scarcely 1 mm. long, mostly broadly elliptic leaves, and minute ovules are distinguishing characteristics of *P. emarginata*. Its affinity is to *P. reticulata* Lundell.

Parathesis ferruginea Lundell, sp. nov.

Frutex, ramuli rufo-tomentelli; folia petiolis 1–2 cm. longis stipitata, lanceolato-oblonga vel oblanceolata, 7.5–15 cm. longa, 2.8–5.3 cm. lata, apice acuminata vel subabrupte acuminata, basi acutiuscula, membranacea, minute crenulata vel crenulato-dentata, subtus adpresse stellato-pubescentia; inflorescentia terminalis, pyramidalis, paniculata, usque ad 18 cm. longa, parce stellato-tomentella, pedicellis 5–9 mm. longis; flores corymbosi

vel subracemoso-corymbosi, ante anthesin usque ad 6 mm. longi, minute tomentelli; sepala anguste triangularia, 1.6–2 mm. longa, acuminata; petala lineari-lanceolata, usque ad 7 mm. longa; stamina 4–4.5 mm. longa; filamenta ca. 1.8 mm. longa; antherae erectae, lineari-lanceolatae, 3–3.7 mm. longae, attenuatae, acutae, dorso area nigro-punctata praeditae; ovarium hirsutum vel parce hirsutum; ovula 4 vel 5, uniseriata.

MEXICO: Jalisco, steep wooded hills above the river (a tributary of Rio Cihuatlan), ca. 11 miles north of bridge of Rio Cihuatlan on road from Santiago, Colima to Durazno, Jalisco, in oak zone, with abundant bamboos, abundant in deep rocky ravine near small stream, elevation 500–550 m., Aug. 1, 1957, *Rogers McVaugh 15975* (type, LL; isotype, MICH), treelike shrub 5 m. high, flowers pink, fruit red, then black.

The species ranges into Nayarit.

Although the long slender anthers suggest *P. columnaris* Lundell, which is related, the affinity of *P. ferruginea* appears to be with *P. prionophylla* Standl., from which it may be separated by the much smaller sepals, finer strictly appressed pubescence of undersurface of leaves, and altogether different anthers. Although the leaves are predominantly crenulate, they are sometimes rather coarsely crenulate-dentate, suggesting *P. prionophylla* and *P. Donnell-Smithii* Mez in this aspect. The fruits are often infested by insects and gall-like.

Parathesis guatemalensis Lundell, sp. nov.

Frutex, ramuli crassiusculi, novelli adpresse ferrugineo-tomentelli; folia petiolis usque ad 1.3 cm. longis stipitata, lanceolata vel lanceolato-elliptica, 9–16 cm. longa, 3–6.5 cm. lata, apice subabrupte acuminata, basi cuneata, subcoriacea, repanda et denticulata vel subintegra, supra novella stellato-pubescentia, rugulosa, subtus novella adpresse stellato-tomentosa; inflorescentia terminalis, tripinnatim paniculata, usque ad 12.5 cm. longa, novella minute stellato-tomentella et papilloso-puberula, pedicellis 4–7 mm. longis; flores subcorymbosi, minute ferrugineo-tomentelli, ante anthesin usque ad 5 mm. longi; sepala lanceolata, ca. 1.5 mm. longa, acuminata; petala lineari-lanceolata, 5 mm. longa, lineato-picta; stamina 3.5–4 mm. longa; filamenta ca. 1.4 mm. longa; antherae erectae, lanceolatae, 2.7–3 mm. longae, acutiusculae, apice parce barbatae, dorso area nigro-punctata praeditae; ovarium ovoideum, apice attenuatum, hirtello-tomentellum; ovula 5 vel 6, uniseriata.

GUATEMALA: Dept. Alta Verapaz, Coban, alt. 1350 m., Aug. 1906, *H. von Tuerckheim Nr. II 1202* (type, F; isotypes, LL, MO, NY).

The anthers have apical hairs, as in *P. serrulata* (Sw.) Mez, but *P. guatemalensis*, although superficially resembling that species, differs immediately in its much larger flowers, larger lanceolate leaves, and in the

character of its tomentum. Clearly akin to *P. hondurensis* Standl., *P. guatemalensis* may be separated from that species by its fewer ovules, finer denser stellate pubescence on undersurface of young leaves, and in having barbate anthers with a triangular black-punctate area dorsally.

Parathesis laxa Lundell, sp. nov.

Arbor, ramuli minute rufo-tomentelli et papillosi; folia petiolis usque ad 2 cm. longis stipitata, lamina magna, lanceolata, 10–20 cm. longa, 4–7 cm. lata, utrinque acuminata, membranacea, obscure crenulata, subtus novella adpresse stellato-pubescentia; inflorescentia terminalis, magna, laxa, paniculata, usque ad 30 cm. longa, basi usque ad 20 cm. lata, parce adpresse tomentella et papilloso-puberula, pedicellis 4–7 mm. longis; flores umbellati, ante anthesin ca. 6 mm. longi, papillosi; sepala anguste triangularia, 1–1.3 longa, acuminata; petala usque ad 6 mm. longa, lineato-picta; stamina ca. 3.8 mm. longa; filamenta ca. 2 mm. longa; antherae erectae, oblongo-lanceolatae, ca. 2.2 mm. longae, dorso area punctata praeditae; ovarium parce hirsutum; placenta apiculata; ovula 8 vel 9, uniseriata.

VENEZUELA: State of Miranda, around Dos Cominos and Los Charros, alt. 800 to 1300 m., March 14, 1913, *H. Pittier 5927* (type, NY).

P. laxa is a very distinct species of uncertain relationships. It is well marked by very large open lax remotely branched panicles with 1- to 5-flowered umbels and slender pedicels, together with large thin leaves. The papillose indument, present even on the costa of leaves above, gives the stems and inflorescence a farinose appearance. The fine silky appressed stellate hairs on undersurface of leaves are conspicuous only at first.

Parathesis mexicana Lundell, sp. nov.

Arbor, ramuli stellato-tomentelli; folia petiolis usque ad 1.5 cm. longis stipitata, oblanceolata vel oblanceolato-elliptica, 9–15 cm. longa, 3–5.7 cm. lata, apice subabrupte acuminata, basi acuminata, membranacea, subintegra, subtus stellato-pubescentia; inflorescentia terminalis, paniculata, congesta, usque ad 10 cm. longa, basi usque ad 9 cm. lata, rufo-tomentella, pedicellis 2.5–4 mm. longis; flores corymbosi vel subracemosi, ante anthesin 5–6 mm. longi, tomentelli; sepala ovata, 1.2–1.5 mm. longa, acuminata; petala usque ad 6 mm. longa, lineato-picta; stamina 3 mm. longa; filamenta punctata, ca. 1.5 mm. longa; antherae erectae, lanceolato-oblongae, 2 mm. longae, apiculatae, dorso area punctata praeditae; ovarium hirsutum; ovula 5 vel 6, uniseriata; fructus depresso-globosi, ca. 6 mm. diam.

MEXICO: Michoacan, Coalcoman District, San Jose, in woods, alt. 900 m., June 12, 1939, *Geo. B. Hinton 13795* (type, LL; isotype, US), tree, flowers pink.

Although the filaments are conspicuously punctate, the glandular dorsal area of the anthers is rather inconspicuous and orange-colored. *P. mexicana* has a rather small compact inflorescence and pedicels not over 4 mm. long which serve further to distinguish it. Its affinity is to *P. rosea* Lundell.

Parathesis oblanceolata Lundell, sp. nov.

Frutex, ramuli ferrugineo-tomentosi; folia petiolis 5–15 mm. longis stipitata, oblanceolata, 7.5–20 cm. longa, 2–5.5 cm. lata, utrinque eleganter acuminata, crenulata vel subintegra, chartacea, subtus novella stellato-pubescentia; inflorescentia terminalis, tripinnatim paniculata, parce stellato-pubescentia et papilloso-puberula, pedicellis 4–7 mm. longis; flores corymbosi, parce ferrugineo-tomentelli, ante anthesin ca. 4.5 mm. longi; sepala anguste triangularia, 1–1.4 mm. longa, acuminata; petala lineari-lanceolata, usque ad 5 mm. longa, lineato-picta; stamina ca. 3 mm. longa; filamenta crassa, 1.5–1.8 mm. longa; antherae erectae, anguste lanceolatae, ca. 2.2 mm. longae, apice acutiusculae, dorso area nigro-punctata praeditae; ovarium parce hirtellum; ovula 6 vel 7, uniseriata.

GUATEMALA: Dept. Alta Verapaz, along Rio Santa Isabel, between mouth of Rio Sebol and El Porvenir, steep shaley slopes, alt. 100 m., Apr. 21, 1942, *Julian A. Steyermark 45853* (type, F; isotypes, LL, US), shrub, 20 ft. tall, leaves deep green above, paler green beneath, pedicels recurved, rose-colored.

Closely akin to *P. hondurensis* Standl., *P. oblanceolata* differs in its oblanceolate subentire leaves, smaller flowers and slenderer buds, stamens a fourth smaller, and anthers scarcely exceeding 2 mm. in length. In *P. hondurensis* the rugulose leaves are lanceolate and cuneate at base. Pubescence of the two is very similar, although a bizonal undersurface of leaf has not been found in *P. oblanceolata*. Both *P. guatemalensis* Lundell and *P. oxyphylla* Lundell belong to this group.

Parathesis oblongifolia Lundell, sp. nov.

Frutex, ramuli crassiusculi, adpresse ferrugineo-tomentelli; folia petiolis usque ad 2.5 cm. longis stipitata, oblonga, anguste oblongo-elliptica vel lanceolata, 8–35 cm. longa, 3–7 cm. lata, utrinque eleganter acuminata, obscure crenulata et repanda, membranacea, subtus novella adpresse stellato-pubescentia; inflorescentia terminalis, tripinnatim paniculata, 5–18 cm. longa, minute adpresse stellato-tomentella et papilloso-puberula, pedicellis 1–4 mm. longis, dense papillosis; flores umbellati, vel subcorymboso-umbellati, ante anthesin usque ad 4 mm. longi, papilloso-puberuli;

sepala triangularia, ca. 1 mm. longa, acuta; petala lineari-lanceolata, 3–4 mm. longa, lineato-picta; stamina 2–2.7 mm. longa; filamenta crassa, 1–1.4 mm. longa; antherae erectae, ovato-oblongae, 1.8–2.2 mm. longae, acutiusculae, dorso area parva punctata praeditae; ovarium hirtello-tomentosum; ovula 4–7, uniseriata.

MEXICO: Veracruz Orizaba region, May 28, 1865–1866, *M. Bourgeau 2450* (type, S; isotypes, K, LL, US).

Of the continental species, *P. oblongifolia* is nearest *P. crenulata* (Vent.) Hook.f. From the West Indian plant, it may be separated at once by its very thin often large, obscurely reticulate leaves which are widest at or below the middle, and by its tomentose ovary. In *P. crenulata*, the leaves are oblanceolate, always widest above middle, and the ovary is very sparsely pubescent apically, often glabrescent. Further, the anthers, usually smaller and less punctate dorsally, the sepals rarely exceeding 1 mm. in length, the shorter pedicels, and the petals mostly 3 to 4 mm. long, are other minor differences which set apart the Mexican species.

In *P. oblongifolia* the floriferous rachis of the terminal corymbs is not accrescent, which among other characteristics separates it from *P. elliptica* Lundell, described also from Orizaba.

The species is represented by several other collections, mostly nineteenth century, from Veracruz, and a single specimen from Tabasco.

Parathesis oxyphylla Lundell, sp. nov.

Ramuli crassiusculi, minute stellato-lepidoti; folia petiolis usque ad 1.5 cm. longis stipitata, oblanceolata vel lanceolata, 8–14 cm. longa, 3–5.5 cm. lata, apice acuminata, basi acuta, chartacea, crenulato-serrulata, supra glabra, subtus peradpresse stellato-pubescentia; inflorescentia terminalis, tripinnatim paniculata, minute stellato-lepidota, pedicellis 3–5 mm. longis; flores subcorymbosi, ante anthesin usque ad 5.5 mm. longi, papilloso-puberuli et stellato-tomentelli; sepala anguste lanceolata, 1.5–2 mm. longa, acuminata; petala anguste lanceolata, ca. 5.5 mm. longa, lineato-picta; stamina 3–3.5 mm. longa; filamenta usque ad 1.5 mm. longa; antherae erectae, lanceolatae, usque ad 2.5 mm. longae, apice acutiusculae, dorso area nigro-punctata praeditae; ovarium minute tomentosum; ovula 6 vel 7, uniseriata.

MEXICO: Oaxaca, Chinantla, May, 184-, *H. Galeotti 1720* (NY, US). Without locality, *Jurgensen 203* (type, K; photo, LL).

The remote rather stout short branches of the inflorescence and finely tomentose ovary, together with the minute stellate-lepidote indument of branchlets and inflorescence, clearly mark *P. oxyphylla*. The leaves and sepals resemble those of *P. hondurensis* Standl. In specimens of *P. oxy-*

phylla examined, no stellate hairs are evident on the upper surface of leaves as in *P. hondurensis*.

Parathesis panamensis Lundell, sp. nov.

Arbor, ramuli crassiusculi, novelli rufo-puberuli et papillosi; folia petiolis usque ad 1.5 cm. longis stipitata, oblanceolata vel oblanceolato-oblonga, 6.5–11.5 cm. longa, 2–4.2 cm. lata, apice subabrupte acuminata, basi acuminata, membranacea, integra, subtus novella subadpresse stellato-pubescentia, prominulo-reticulata; inflorescentia terminalis, parva, paniculata, 4–7 cm. longa, papillosa et minute rufo-puberula, pedicellis 4–6 mm. longis; flores corymbosi, ante anthesin ca. 5 mm. longi, papillosi et minute puberuli; sepala subulata, 1.7–2 mm. longa; petala lineari-lanceolata, 5 mm. longa, lineato-picta; stamina 4 mm. longa; filamenta 3.5 mm. longa, lineato-picta; antherae versatiles, lanceolato-oblongae, 1.5 mm. longae, dorso area nigro-punctata praeditae; ovarium ovoideum, apice minute rufo-puberulum; placenta apiculata; ovula 5 vel 6, uniseriata.

PANAMA: Talamanca Valley, 1927, *G. P. Cooper & G. M. Slater 153* (type, US; photo, LL).

Although known from a single poor specimen, the affinities of *P. panamensis* are evident. Of the species with versatile anthers, it is nearest *P. trichogyne* Hemsl. and *P. pallida* Lundell, but differs from both in having a small inflorescence shorter than the leaves, subulate sepals up to 2 mm. long, ovary merely puberulent at apex, and a small placenta with only 5 or 6 strictly uniseriate ovules.

Parathesis papillosa Lundell, sp. nov.

Frutex vel arbor, ramuli crassiusculi, minute brunneo-lepidoti; folia petiolis usque ad 3 cm. longis stipitata, oblanceolata vel oblanceolato-oblonga, 12–25 cm. longa, 3.5–6.5 cm. lata, apice subabrupte acuminata, basi acuta, subcoriacea, integra, subtus adpresse stellato-pubescentia; inflorescentia terminalis, tripinnatim paniculata, usque ad 30 cm. longa, basi usque ad 25 cm. lata, dense lepidota et papillosa; flores 4- vel 5-meri, umbellati vel subcorymbosi, ante anthesin ca. 4 mm. longi, dense papillosi; sepala ovato-triangularia, ca. 1 mm. longa, acuminata; petala lineari-lanceolata, ca. 4 mm. longa, lineato-picta; stamina usque ad 2.5 mm. longa; filamenta 2 mm. longa; antherae versatiles, ovato-oblongae, 1.2–1.4 mm. longae, dorse area minute et parce nigro-punctata praeditae, raro epunctatae; ovarium minute papillosum; ovula 9–13.

GUATEMALA: Dept. Alta Verapaz, Pansamala, alt. 3800 pp., June, 1886, *H. von Tuerckheim 921* (type, US; photo, LL), a tree.

As in *P. tetramera* Bullock, *P. papillosa* has flowers 4- or 5-parted, a rarity in the genus, but the two species are not otherwise similar. In addition to versatile anthers, other clearly delimiting characteristics are its ovary minutely papillose at apex, anthers with few minute black glands dorsally or eglandular, lepidote and papillose indument of all parts, very large panicles, and large narrow thick entire leaves.

Parathesis parvifolia Lundell, sp. nov.

Ramuli graciles, novelli ferrugineo-tomentosi; folia petiolis 2–6 mm. longis stipitata, lanceolata, oblongo-lanceolata vel raro oblanceolata, 4.5–7.5 cm. longa, 1.7–3.2 cm. lata, apice obtuse acuminata, basi acutiuscula, chartacea, margine dentato-crenulata, supra glabra, subtus stellato-hirtella; inflorescentiae terminales, parvae, usque ad 3.5 cm. longae, parce stellato-hirtellae et papilloso-puberulae, pedicellis usque ad 4 mm. longis; flores corymbosi, ante anthesin ca. 3.5 mm. longi, ferrugineo-tomentelli; sepala triangularia, ca. 1 mm. longa, acuta; petala lanceolata, lineato-picta; stamina ca. 2 mm. longa; filamenta ca. 1 mm. longa; antherae erectae, ovato-triangulariae, ca. 1.3 mm. longae, apice obtusae vel rotundatae, et parce barbatae, dorso area dense nigro-punctata praeditae; ovarium et stylum glabrum, raro parce hirsutum; placenta depresso-globosa, minute apiculata; ovula 5, uniseriata.

HISPANIOLA: Haiti, Dep. du Sud, Morne de la Hotte in declivibus sept.-orient. in montibus sylvatic., cr. 800 m. alt., June 11. 1917, *E. L. Ekman H189* (type, S; photo, LL), flor. roseis.

The species is known only from the type specimen at Stockholm.

Superficially *P. parvifolia* appears to be a diminutive variety of *P. serrulata* (Sw.) Mez, but the smaller rather remotely dentate-crenulate lanceolate leaves, the leaf blades with sparse stipitate or subsessile rather coarse erect stellate hairs on undersurface, the sharply reduced inflorescences less than 3.5 cm. long, the smaller anthers not apiculate at apex, and the essentially glabrous ovary with 5 ovules serve to distinguish the species. Its kinship to *P. serrulata* is obvious, but that species has sessile stellate hairs with long spreading to appressed rays on undersurface of leaf, larger anthers conspicuously apiculate and red-barbate at apex, ovary sparsely but consistently hairy apically with branched hairs, style hairy below middle, and 6 or 7 ovules.

Its stipitate hairs show a possible relationship to the Central American *P. chiapensis* Fernald and *P. sessilifolia* Donn. Sm.

Parathesis pyramidalis Lundell, sp. nov.

Arbor parva, ramuli stellato-tomentosi; folia petiolis usque ad 2 cm.

longis stipitata, obovata, oblanceolata vel oblanceolato-elliptica, 10–20 cm. longa, 4–8 cm. lata, apice rotundata et abrupte acuminata, basi acuta, chartacea, crenulata vel subintegra, subtus adpresse vel subadpresse stellato-pubescentia; inflorescentia terminalis, pyramidalis, paniculata, usque ad 30 cm. longa, basi usque ad 20 cm. lata, rufa, minute stellato-tomentosa, pedicellis 4–7 mm. longis; flores subcorymbosi vel subracemosi, ante anthesin 6 mm. longi, tomentelli; sepala ovato-triangularia, 1–1.2 mm. longa, acuminata; petala lineari-lanceolata, usque ad 7 mm. longa, lineato-picta; stamina 4 mm. longa; filamenta ca. 2.5 mm. longa, nigro-punctata; antherae erectae vel versatiles, lanceolatae, 2.2–2.4 mm. longae, apice obtusae, dorso area nigro-punctata praeditae; ovarium hirsuto-tomentosum; ovula 11–14, biseriata.

COLOMBIA: Santa Marta, deep ravines in mountain forest below Valparaiso, alt. 3500 ft., March, 1898–1901, *Herbert H. Smith 1726* (type, NY; isotypes, MO, US; photo, LL), a tree, 20 or 25 ft., flowers in March, petals pink.

Its numerous partially biseriate ovules and anthers that are tardily versatile indicate a relationship to *P. trichogye* Hemsl. and *P. pallida* Lundell, but in general aspects *P. pyramidalis* resembles *P. reticulata* Lundell, *P. emarginata* Lundell, and *P. reticulata* var. *sinuata* Lundell, all of which are found in the Santa Marta country. The fewer uniseriate ovules and strictly erect anthers of these Colombian species suggest that this superficial resemblance to *P. pyramidalis* is an example of convergence due to similar environmental conditions under which they grow.

Parathesis reticulata Lundell, sp. nov.

Arbor parva, ramuli crassi, novelli peradpresse ferrugineo-tomentelli; folia petiolis usque ad 2 cm. longis stipitata; lamina membranacea, elliptica, oblanceolata vel obovato-elliptica, 10–25 cm. longa, 4.5–9 cm. lata, apice subabrupte acuminata, basi angustata, acuta, margine obscure crenulata, supra glabra, subtus novella adpresse stellato-pubescentia; inflorescentia terminalis, tripinnatim paniculata, basi stellato-tomentella, papilloso-puberula, pedicellis 3–5 mm. longis; flores corymbosi vel subcorymbosi, ante anthesin ca. 5 mm. longi, dense papilloso-puberuli; sepala parva, ovato-triangularia, 0.8–1 mm. longa, acuta, nigro-punctata; petala usque ad 5.5 mm. longa, lineato-picta; stamina 3 mm. longa; filamenta ca. 1.8 mm. longa; antherae erectae, lanceolato-ellipticae, ca. 2 mm. longae, apice obtusae et apiculatae, dorso area nigro-punctata praeditae. ovarium ovoideum, apice parce pilosum; ovula 6–9, oblonga, uniseriata;

COLOMBIA: Santa Marta, mountain forest near Valparaiso, 3000–4500 ft., 1898–1899, *Herbert H. Smith 1725* (type, NY; photo and fragment, LL), flowers Mar. to May.

In the Santa Marta country of Colombia, *Parathesis* is represented by

three species and a variety which are separable mainly by floral differences. *P. reticulata* and its var. *sinuata* and *P. emarginata* Lundell have strictly erect anthers attached below middle, while in *P. pyramidalis* Lundell, the larger anthers, attached medially, are tardily versatile after anthesis. In *P. pyramidalis* there are 11 to 14 ovules partially biseriate and exposed apically through apertures in the placenta wall, while in *P. reticulata* and *P. emarginata* there are 6 to 9 uniseriate ovules completely enclosed.

P. emarginata and *P. reticulata*, which grow between 1500 and 4500 ft., have densely papillose-puberulent flowers, and differ primarily in anther and ovule characteristics. *P. reticulata* var. *sinuata* is readily separable from both by its finely tomentose flowers.

P. reticulata may be distinguished from *P. emarginata* by its smaller obtuse and apiculate anthers, larger areolate leaves, ovary pubescent rather sparingly at apex, and in having oblong-obovoid ovules almost twice as large.

Parathesis reticulata var. **sinuata** Lundell, var. nov.

Frutex; ramuli peradpresse ferrugineo-tomentelli; folia petiolis usque ad 2 cm. longis stipitata, elliptica vel obovato-oblonga, sinuata, reticulata; inflorescentiae minute ferrugineo-tomentellae; flores ante anthesin 6 mm. longi, tomentelli; sepala lanceolata, 1–1.5 mm. longa, acuminata; stamina usque ad 3.5 mm. longa; antherae erectae, anguste triangularae, obtusae, apiculatae; ovarium ovoideum, apice pilosum.

COLOMBIA: Santa Marta, on Donamo Road, occasional on banks of streams in forest, below 1200 ft., April 8, 1898-1899, *Herbert H. Smith 1724* (type, NY; isotypes, F, LL, MO, S, US).

By its finely tomentose larger flowers, leaves with sinuate margins, and narrower acuminate longer sepals, the variety may be readily recognized.

Parathesis rosea Lundell, sp. nov.

Frutex, ramuli crassiusculi, brunneo-tomentelli, folia petiolis 7–14 mm. longis stipitata, oblongo-elliptica, 10–17 cm. longa, 3.2–6.5 cm. lata, apice subabrupte acuminata, basi cuneata, chartacea, integra vel repanda, subtus peradpresse stellato-pubescentia; inflorescentia terminalis, late pyramidalis, usque ad 15 cm. longa, parce brunneo-tomentella, pedicellis 3–5 mm. longis; flores corymbosi, ante anthesin ca. 6.5 mm. longi, minute villosi; sepala ovata, 1.5–2 mm. longa, subulata; petala lineari-lanceolata, ca. 7 mm. longa, lineato-picta; stamina 3 mm. longa; filamenta crassa, ca. 1.7 mm. longa; antherae erectae, ovato-lanceolatae, ca. 2.2 mm. longae, acutiusculae, dorso area nigro-punctata praeditae; ovarium hirsutum; ovula 6, uniseriata.

MEXICO: Jalisco, Sierra del Halo, near a lumber road leaving the Colima highway 7 miles south-southwest of Tecalitlan and extending southeasterly toward San Isidro, steep slopes in pine-oak forest, 2 5 miles from the highway, abundant in barranca, elevation 1400–1500 m., June 23, 1957, *Rogers McVaugh 15021* (type, LL; isotype, MICH), shrub to 3 m. high, flowers dull pink, fruit red.

Closely akin to *P. mexicana* Lundell and to be distinguished from that species by the anthers which have a black-punctate dorsal area, by its larger sepals and by a series of other tangible though perhaps minor features. Like a number of others in the genus, these species are nondescript.

Parathesis rufa Lundell, sp. nov.

Arbor parva, ramuli crassiusculi, rufo-tomentosi; folia petiolis usque ad 2 cm. longis stipitata, oblongo-elliptica, oblanceolata vel obovata, 12–27 cm. longa, 5–9 cm. lata, apice subabrupte acuminata, basi acuta, subcoriacea, rugosa, crenulata, supra novella parce stellato-pubescentia, subtus adpresse stellato-pubescentia; inflorescentia terminalis, rufa, tripinnatim paniculata, papilloso-puberula et stellato-tomentella, pedicellis 3–5 mm. longis; flores subcorymbosi, ante anthesin ca. 5 mm. longi, papilloso-puberuli et tomentelli; sepala anguste triangularia, 1.2–2.2 mm. longa, subulato-acuminata; petala anguste lanceolata, ca. 5.5 mm. longa, lineato-picta; stamina ca. 3 mm. longa; filamenta crassa, ca. 1.3 mm. longa; antherae erectae, lanceolato-oblongae, ca. 2.4 mm. longae, apice acutae, apiculatae, dorso area nigro-punctata praeditae; ovarium glabrum, raro parce hirtellum et papillosum; ovula 6 vel 7, elliptico-oblonga, uniseriata; fructus ad 8 mm. diam., subglobosi.

BRITISH HONDURAS: Toledo District, on riverbank, Botan Creek, Rio Grande, May 25, 1944, *Percy H. Gentle 4649* (type, LL), tree, 7 in. diam., flowers pink, berries black.

The tomentum of the branchlets and base of inflorescence, consisting of multibranched hairs, is suggestive of *P. sessilifolia* Donn. Sm. The coarse hairs of *P. sessilifolia*, both of branchlets and undersurface of leaf, are distinctly stipitate, while they are sessile in *P. rufa* and much finer on all parts. The pubescence of the leaf of *P. rufa* is obscurely bizonal, a condition not evident in *P. sessilifolia*.

Parathesis subcoriacea Lundell, sp. nov.

Arbor parva, ramuli crassiusculi, minute brunneo-lepidoti; folia petiolis usque ad 2 cm. longis stipitata, lanceolata, 8–15 cm. longa, 2.5–5 cm. lata, apice acuminata, basi cuneata, subcoriacea, integra vel subintegra, subtus novella peradpresse stellato-puberula, glabrata; inflorescentia terminalis vel axillaris, congesta, parce lepidoto-papillosa, pedicellis 2.5–3 mm. longis;

flores umbellati, ante anthesin 3 mm. longi, minute papillosi; sepala anguste triangularia, 0.8–1 mm. longa, acuminata; petala anguste triangularia, 3 mm. longa; stamina 2 mm. longa; filamenta ca. 1 mm. longa; antherae erectae, lanceolatae, 1.2–1.4 mm. longae, acutae, epunctatae; ovarium glabrum; placenta apiculata; ovula 10–12, minuta, uniseriata.

MEXICO: Chiapas, Haciendita, near Escuintla, in advanced forest, alt. 1950 m., June 23, 1945, *Eizi Matuda 5985* (type, LL).

The variable inflorescence, terminal and axillary on some branches, strictly axillary on others, is a peculiarity of *P. subcoriacea*. The very small flowers congested in few-flowered umbels, small epunctate anthers, subcoriaceous leaves glabrous at maturity, glabrous ovary, and numerous minute ovules well mark the species as one of the most distinct in the genus. Its relationship is obscure, but possibly with *P. lanceolata* Brandeg., also of Chiapas.

Parathesis subulata Lundell, sp. nov.

Frutex, ramuli graciles, novelli adpresse tomentelli; folia petiolis 5–15 mm. longis stipitata, lanceolato-oblonga, 5–9.5 cm. longa, 1.2–2.3 cm. lata, apice caudato-acuminata, basi acuminata, glabra, membranacea, minute crenulata; inflorescentia axillaris, pauciflora, paniculata, 3–6 cm. longa, glabra, pedicellis 3–6 mm. longis; flores corymbosi; sepala parva, subulata, ca. 0.75 mm. longa, parce et minute puberula; ovarium ovoideum, minute adpresse tomentellum; placenta depresso-globosa; ovula 7 vel 8, uniseriata.

GUATEMALA: Dept. Huehuetenango, Sierra de los Cuchumatanes, Cerro Victoria, near Barillas, in *Liquidambar-Pinus* forest, alt. 1800–2000 m., July 29, 1942, *Julian A. Steyermark 49714* (type, F; isotype, US), shrub, 8–10 ft. tall; fruit turning dull rose-red, leaves firmly membranous, deep green above, paler grass green beneath.

P. subulata is closely akin to *P. tenuis* Standl. of Oaxaca, but differs notably in having 7 or 8 ovules exposed apically and style up to 4 mm. long. In *P. tenuis* the 3 or 4 ovules are enclosed and the style is about 2.5 mm. long. The oblongish leaves with longer petioles and minute subulate sepals are other distinguishing characteristics of *P. subulata*.

Parathesis tomentosa Lundell, sp. nov.

Arbor parva, ramuli graciles, novelli peradpresse tomentelli; folia petiolis 5–14 mm. longis stipitata, obovata vel obovato-elliptica, 5–9.5 cm. longa, 3.5–4.5 cm. lata, apice rotundata et abrupte acuminata, basi cuneata, membranacea, crenulata, supra glabra, subtus novella parce et minute

stellato-lepidota, pellucido-punctata; inflorescentia terminalis, sessilis, paniculata, usque ad 5 cm. longa, pauciflora, parce puberula, pedicellis gracillimis, 5–9 mm. longis, minute puberulis; flores corymbosi; sepala anguste triangularia, 1–1.2 mm. longa, subulata, pellucido-punctata, minute puberula; petala lineari-lanceolata, 3.5 mm. longa, intus papilloso-tomentella; ovarium ovoideum, tomentosum; placenta depresso-globosa, apiculata; ovula 8 vel 9, uniseriata.

GUATEMALA: Los Andes to Entre Rios, March 1, 1926, *S. J. Record G. 44* (type, US), small tree, *"chimiche."*

In the absence of stamens, the relationship of the species is not certain, but it appears to have affinity to *P. Rekoi* Standl. and *P. macronema* Bullock, both of which have a long pedunculate axillary rather than a terminal inflorescence. Other features distinguishing *P. tomentosa* are its ovary densely tomentose over the entire surface, and short style tomentose to middle. The corolla is described from a single loose petal adhering to a pedicel. This petal is densely papillose-tomentose over the entire inner surface, as in *P. Rekoi* and *P. macronema.*

Parathesis vestita Lundell, sp. nov.

Frutex vel arbor parva, ramuli crassiusculi, dense rufo-villosi; folia petiolis 5–15 mm. longis stipitata, oblanceolata, oblanceolato-elliptica vel obovato-elliptica, 10–30 cm. longa, 3–10 cm. lata, apice subabrupte acuminata, basi acutiuscula vel acuminata, membranacea, dentata, supra hirtella, subtus parce villosa; inflorescentia axillaris, 10–25 cm. longa, villosa, pedicellis 6–12 mm. longis; flores corymbosi vel racemoso-corymbosi, ante anthesin usque ad 7 mm. longi, papilloso-tomentelli; sepala anguste triangularia, 1.4–2 mm. longa; petala lineari-lanceolata, 6–7 mm. longa, lineato-picta; stamina usque ad 3.5 mm. longa; filamenta crassa, 1.4–1.5 mm. longa; antherae erectae, ovatae vel ovato-lanceolatae, 2–2.5 mm. longae; ovarium villosum; ovula 6 vel 7, uniseriata; fructus depresso-globosi, usque ad 9 mm. diam.

GUATEMALA: Dept. Quezaltenango, Finca Pirineos, below Santa Maria de Jesus, in damp dense forest, alt. 1350–1380 m., March 11, 1939, *Paul C. Standley 68219* (type, F; isotype, LL), tree 25 ft., branches of inflorescence dull red, flowers white; Volcan Zunil, in second-growth woodland, alt. 5600 ft., Aug. 7, 1934, *A. F. Skutch 898* (A), shrub, fls. white, pedicels and peduncles red, berries black at maturity; along old road between Finca Pirineos and Patzulin, in dense damp forest, alt. 1200–1400 m., Feb. 9, 1941, *Standley 87131* (F), shrub 2 m. tall, flowers white, pedicels purplish red.

The species has been collected repeatedly in the mountain forest of Guatemala. Related to *P. pleurobotryosa* Donn. Sm., with which it has been confused, *P. vestita* is notably different in having coarse villous in-

dument of mostly simple hairs, a villous-tomentose ovary with style short villous basally, and large thin leaves distinctively and conspicuously dentate mostly with sharp small teeth. In *P. pleurobotryosa* the indument is denser and of conspicuously stellate stipitate hairs, the ovary is only short villous at apex with the style glabrous, and the margin of the small subchartaceous leaves is rather obscurely crenulate.

Parathesis villosa Lundell, sp. nov.

Frutex vel arbor parva, ramuli crassiusculi vel graciles, novelli tomentelli; folia petiolis 7–12 mm. longis stipitata, elliptica, lanceolata vel oblanceolata, 7–18 cm. longa, 2.5–6 cm. lata, apice acuminata vel subabrupte acuminata, basi acuta vel acuminata, membranacea, subintegra vel minute crenulata, subtus novella stellato-tomentosa; inflorescentia axillaris, villosa et papilloso-puberula, 3–20 cm. longa, pedicellis 3–10 mm. longis; flores corymbosi, papilloso-tomentelli, ante anthesin 6–7 mm. longi; sepala ovato-lanceolata, 1.2–2.5 mm. longa, acuta vel acuminata; petala 6–7.5 mm. longa, intus papilloso-tomentosa, lineato-picta; stamina usque ad 3.8 mm. longa; filamenta crassa, glabra, 1.5–2 mm. longa, punctata; antherae erectae, lanceolato-triangulariae vel ovatae, 2–2.5 mm. longae, dorso area punctata praeditae; ovarium ovoideum, apice villosum; ovula 8–10, uniseriata.

MEXICO: Michoacan, Dist. Coalcoman, Pto. Zarzamora, in woods, alt. 1600 m., April 27, 1939. *Geo. B. Hinton 13721* (type, LL; isotypes, F. GH, MO, US), shrub 4 m., fl. pink; Dist. Coalcoman, S. Torricillas, in woods, alt. 1760 m., April 18, 1939, *Hinton 13717* (GH, LL, TEX, US), tree 4 m., fl. pink.

The floriferous branchlets have reduced leaves apically so that the axillary inflorescences appear terminal. The villous indument of the inflorescence, leaves tomentose at first on lower surface with fine stellate long-rayed hairs, and flowers with all parts conspicuously punctate, including filaments and style, together with the depressed-globose placenta with 8 to 10 ovules are noteworthy features of *P. villosa*. It represents a singular widely distributed group.

VOLUME 3 DECEMBER, 1963 NUMBER 5

WRIGHTIA

A BOTANICAL JOURNAL

CONTENTS

Studies of the American Myrsinaceae—I.
By Cyrus Longworth Lundell..... 77

Novelties in Colubrina Including Cormonema and Hybosperma (Rhamnaceae). By Marshall C. Johnston..... 91

PUBLISHED BY
TEXAS RESEARCH FOUNDATION
RENNER, TEXAS

MISSOURI BOTANICAL

MAR 9 - 1964

E 10

GARDEN LIBRARY

WRIGHTIA

WRIGHTIA, a botanical journal, is a publication of Texas Research Foundation. The contributions are by staff members and collaborators.

Each volume will contain a series of numbers, to be issued at irregular intervals. The subscription price for Volume 3 is $12.00, postpaid.

VOLUME 3, NUMBER 5
ISSUED DECEMBER 31, 1963

Printed in the U.S.A.
Etheridge Printing Company
Dallas, Texas

BV 0104502
TROPICO

WRIGHTIA

VOLUME 3 DECEMBER, 1963 NUMBER 5

STUDIES OF THE AMERICAN MYRSINACEAE—I

CYRUS LONGWORTH LUNDELL

In connection with revisionary work on the genus *Parathesis*, and the American species of *Ardisia*, additional novelties are described. Other notes include nomenclatural changes and new names. The subgenus *Synardisia* Mez is recognized as distinct from *Ardisia*, and raised to generic status.

Ardisia McVaughii Lundell, sp. nov.

Frutex vel arbor parva, ramuli graciles, glabri; folia petiolis 3–8 mm. longis stipitata; lamina oblanceolata vel oblanceolato-elliptica, 7–18 cm. longa, 2.5–5.5 cm. lata, apice acuminata vel subabrupte acuminata, basi angustata, acuta, integra vel obscure crenulata, glabra, membranacea vel subchartacea; inflorescentia terminalis, glanduloso-puberula, paniculata, usque ad 3 cm. longa, 4 cm. lata; pedicelli 2–4 mm. longi, raro usque ad 7 mm. longi, parce glanduloso-puberuli; flores subcorymbosi; sepala lanceolata vel oblongo-lanceolata, 1.75–2 mm. longa, glanduloso-ciliolata, punctata; petala ovato-lanceolata, 3.5–4 mm. longa, basi connata ca. 1 mm., dense glanduloso-puberula, epunctata; stamina 4.5–5 mm. longa, petala multo superantia; filamenta 4–4.5 mm. longa, glabra; antherae cordatae, ca. 0.5 mm. longae, epunctatae; ovarium parce glanduloso-puberulum; ovula numerosa, pluriseriata, immersa.

MEXICO: Jalisco, steep mountains 11–12 miles south of Talpa de Allende, in the headwaters of a west branch of Rio de Talpa, barranca above a rapid clear stream, in dense forest of *Quercus, Carpinus, Distylium, Magnolia, Podocarpus*, with pine forest on the ridges above, elev. 1200–1700 m., Oct. 18–19, 1960, *Rogers McVaugh 20396* (type, MICH; isotype, LL), abundant shrub 2–3 m. high, flowers greenish yellow.

A. McVaughii is referable to the subgenus Walleniopsis, heretofore represented in Mexico only by *A. tacanensis* Lundell of Chiapas.

Ardisia mexicana Lundell, sp. nov.

Frutex, ramuli graciles, novelli minute puberuli; folia petiolis usque ad 1 cm. longis stipitata; lamina oblongo-oblanceolata, 6.5–10 cm. longa,

1.7–3.5 cm. lata, apice obtusa vel acutiuscula, basi acutiuscula, integra, membranacea, glabrata; inflorescentia terminalis, paniculata, usque ad 5.5 cm. longa, 6.5 cm. lata, minute glanduloso-puberula; pedicelli 3–6 mm. longi, glanduloso-puberuli; sepala ovata, 2 mm. longa, glanduloso-ciliolata, minute punctata; petala oblongo-elliptica, ca. 5 mm. longa, basi connata ca. 2 mm., parce punctata, intus prope basin glanduloso-puberula; stamina ca. 3.5 mm. longa; filamenta ca. 2.5 mm. longa, glanduloso-puberula; antherae erectae, lanceolatae, ca. 1.6 mm. longae, dorso area punctata praeditae; ovarium glabrum; ovula numerosa, pluriseriata, immersa.

MEXICO: Jalisco, moist forested crest of ridge facing the Pacific, 10 miles south of Autlan, ca. 5700 ft. alt., Aug. 20, 1949, *R. L. & C. R. Wilbur 2460* (type, LL; isotype, MICH), slender shrub about 3 m. high, petals rose-pink, anthers yellow, filaments white.

Ardisia phaenostemona (Donn. Sm.) Lundell, comb. nov.

Stylogyne phaenostemona Donn. Sm., Bot. Gaz. 46. 113. 1908.

GUATEMALA: Dept. Alta Verapaz, alt. 1350 m., *H. von Tuerckheim II. 1814* (type, US).

Ardisia staminosa Lundell, nom. nov.

Ardisia micrantha Donn. Sm., Bot. Gaz. 14: 26. 1889, not *A. micrantha* H.B.K., 1818.
Parathesis micranthera Donn. Sm., Bot. Gaz. 18: 205. 1893, not *Ardisia micranthera* Pitard, 1930.

GUATEMALA: Dept. Alta Verapaz, mountain forest near Coban, alt. 4600 ft., March, 1888, *H. von Tuerckheim 1365* (type, US; isotype, F), a tree.

This species and *A. phaenostemona* (Donn. Sm.) Lundell are referable to the subgenus Walleniopsis, which is distinguished by its exserted stamens with very small mostly cordate anthers.

PARATHESIS ADENANTHERA (Miq.) Hook.f., ex Mez, Pflanzenreich IV. 236: 179. 1902.

Ardisia adenanthera Miq., Fl. Brasil. 10: 285. 1856.
Tinus adenanthera (Miq.) O. Ktze, Rev. Gen. 2: 974. 1891.
Ardisia ferruginea H.B.K. var.? *macrophylla* Benth., Pl. Hartweg. 217. 1846; Benth. & Hook.f., Gen. Pl. 2: 645. 1876.
Parathesis macrophylla (Benth.) Britton, ex Rusby, Mem. Torrey Bot. Club 4: 217. 1895; not *P. macrophylla* Rusby, ex Mez, Pflanzenreich IV. 236: 180. 1902.
Parathesis rubella Moldenke, Phytologia 1: 11. 1933.

COLOMBIA: Prov. Bogota, Hacienda de Palmar, village of Guadua, *Hartweg* (type of *Ardisia ferruginia* H.B.K.? var. *macrophylla* Benth., K), a shrub 6 ft. high; Valparaiso, vicinity of Medellin, July 22, 1928, *Rafael A. Toro 1363* (NY); Dept. Boyaco, region of Mt. Chapon, northwest of Bogota, stream-side in high thick forest, alt. 6000 ft., July 31, 1932, *A. E. Lawrence 372* (type of *P. rubella* Moldenke, NY; isotypes, A, F, GH, MO, S), tree 15–20 ft., 8–12 in., fls. pink; Dept. del Valle, Cordillera Occi-

dental, vertiente occidental, Hoya del Rio Sanquinini, lado izquierdo, La Laguna, bosques, alt. 1250–1400 m., Dec. 10–20, 1943, *J. Cuatrecasas 15426* (F), arbolito; Hoya del Rio Cali, Pichinde, entre La Marina y La Margarita, potreros y residuos de Monte, alt. 2120–2260 m., Nov. 4, 1944, *Cuatrecasas 18600* (F), arbolito, 6 m., drupas rojas, brillantes, esferico aplastadas 16 mm. diam.; La Cumbre, quebrada La Ventura, alt. 1650 m., Apr. 9, 1947, *Lorenzo Uribe Uribe 1552* (F); without locality, 1760–1808, *Jose Celestino Mutis 474* (US); *Guodot* (K). PERU: Cuchero, *Poeppig 1667* (isotype of *A. adenanthera* Miq., GH); La Merced, alt. ca. 2000 ft., Aug. 10 24, 1923, *J. Francis Macbride 5519* (F), slender 15 ft. tree, La Merced, Hacienda Schunke, alt. ca. 4000 ft., Aug. 27 Sept. 1, 1923, *Macbride 5604* (F), slender 6 ft. shrub; Dept. Junin, east of Quimiri Bridge, near La Merced, dense forest, alt. 800–1300 m., June 1–3, 1929, *E. P. Killip & A. C. Smith 23912* (US), shrub, 10–12 ft.; Rio Paucartambo Valley, near Perene Bridge, alt. 700 m., June 19, 1929, *Killip & Smith 25392* (F, NY, US), tree, 15–20 ft.; Dept. and Prov. Huanuco, near confluence of Rio Cayumba with Huallaga, virgin forest on slope above river, alt. 860 m., Oct. 13, 1936, *Ynes Mexia 8286* (F, GH, MO, NY, S, UC, US), shrub 5 m. high, mature fruit black, common; Tarapoto, *R. Spruce* (K); Moro, June, 1866, *R. Pearce* (K), shrub, 4–6 ft.; July, 1854, *Lechler 2473* (K); *Ruiz & Pavon* (K). BOLIVIA: Tumupasa, alt. 1800 ft., Dec. 12, 1901, *R. S. Williams 452* (NY, US), slender bush, 14 ft. high, fls. purplish; Rurrenabaque, alt. 1000 ft., Dec. 9, 1921, *M. Cardenas 1967* (GH, K, MICH, NY, US).

P. adenanthera and *P. Candolleana* Mez are very closely related. Both are recognizable among South American species by their filaments which are pilose with short gland-tipped hairs.

Parathesis angustifolia Lundell, nom. nov.

P. macrophylla Rusby, ex Mez, Pflanzenreich IV. 236: 180. 1902, not *P. macrophylla* (Benth.) Britton, ex Rusby, Mem. Torrey Bot. Club 4: 217. 1895.

BOLIVIA: Songo, November, 1890, *Miguel Bang 861* (type, US; isotypes, F, GH, LL, MICH, MO, NY).

The species, akin to *P. adenanthera* (Miq.) Hook.f., has glabrous filaments, unusually narrow caudate leaves, and branchlets apically pubescent at first with minute ferruginous stellate appressed hairs. *Bang 861* is the type of *P. macrophylla* Rusby. *P. macrophylla* (Benth.) Britton is a synonym of *P. adenanthera*.

Parathesis aurantiaca Lundell, sp. nov. Fig. 49.

Frutex vel arbor parva, ramuli novelli peradpresse tomentelli; folia petiolis 1–2.5 cm. longis stipitata; lamina lanceolata, lanceolato-elliptica vel oblanceolata, 7–20 cm. longa, 2.5–6 cm. lata, membranacea, crenulato-serrulata, apice acuminata vel subabrupte acuminata, basi acuminata, subtus novella minute adpresse stellato-pubescentia, pellucido-punctata; inflorescentia axillaris, pedunculata, paniculata, 5–17 cm. longa, laxa, minute adpresse tomentella; pedicelli 7–11 mm. longi, puberuli; flores

Fig. 49. *Parathesis aurantiaca* Lundell (type, *Allen & Severen 7310*, LL): 1, flowering branch, × ½; 2, pistil, × 5; 3, stamen, dorsal view, × 5; 4, calyx, spread out, × 5; 5, petal, inner surface, × 5. Illustrated by Vivien Frazier.

Fig. 50. *Parathesis chrysophylla* Lundell (type, *Galusser 3*, Y): 1, flowering branch, × ½; 2, pistil, × 5; 3, young leaf, lower surface showing bizonal pubescence, × ½; 4, calyx, spread out, × 5; 5, flower, note versatile anthers, × 5; 6, petal, inner surface, × 5. Illustrated by Vivien Frazier.

umbellati vel corymbosi, 5- vel 6-meri, ante anthesin usque ad 7 mm. longi, aurantiaco-punctati, minute tomentelli; sepala puberula, triangularia, usque ad 1.5 mm. longa; petala lineari-lanceolata, usque ad 8 mm. longa, aurantiaco-punctata; stamina 3–4 mm. longa; filamenta crassa, glabra, 1.5–2 mm. longa; antherae erectae, lanceolatae, 2.2–2.7 mm. longae, dorso area aurantiaco-punctata praeditae; ovarium glabrum, apice parce pilosum; ovula 7–10, uniseriata.

EL SALVADOR: Dept. Chalatenango, Los Esesmiles, highland area east of La Palma, fairly common at about 7500 ft. in association with *Rapanea* in pine forest, May 6–7, 1959, *Paul H. Allen & Mario Lewy van Severen 7310* (type, LL; isotypes, F, NY), tree, to about 20 ft., flowers pink.

A cloud forest endemic, known only from the type locality, *P. aurantiaca* is notable for having all flower parts orange-punctate. Its relationship appears to be with *P. glabra* Donn. Sm.

Parathesis chrysophylla Lundell, sp. nov. Fig. 50.

Arbor parva, ramuli crassiusculi, minute adpresse tomentosi; folia petiolis 1–4 cm. longis stipitata; lamina lanceolata, oblongo-elliptica vel oblanceolata, 12.5–25 cm. longa, raro usque ad 45 cm. longa, 4.5–9 cm. lata, raro usque ad 14 cm. lata, utrinque acuminata vel subabrupte subacuminata, integra, chartacea, subtus adpresse stellato-pubescentia; inflorescentia terminalis, pyramidalis, paniculata, usque ad 30 cm. longa, minute rufo-tomentosa, dense papillosa et stellato-hirtella; pedicelli usque ad 7 mm. longi; flores corymbosi, minute rufo-tomentosi, ante anthesin ca. 6 mm. longi; sepala triangularia, 1–1.4 mm. longa, acuta vel acuminata; petala anguste lanceolata, ca. 6 mm. longa; stamina usque ad 4.5 mm. longa; filamenta usque ad 3.5 mm. longa; antherae parvae, versatiles, lanceolato-oblongae, ca. 2 mm. longae, dorso area nigro-punctata praeditae; ovarium hirsuto-tomentosum; ovula 11–14.

GUATEMALA: Santa Ines, Feb. 25, 1927, *Carlos Galusser 3* (type, Y; isotype, US), small tree, flowers white, fruit purple, "*camaco.*"

P. chrysophylla is very closely related to *P. trichogyne* Hemsl., differing in having larger leaves, denser glandular indument of the inflorescence, larger flowers with broad sepals up to 1.4 mm. long, and glabrous style almost 5 mm. long.

Parathesis Hintonii Lundell, sp. nov.

Arbor parva, ramuli gracillimi, minute stellato-tomentosi; folia petiolis 1–1.5 cm. longis stipitata; lamina elliptica vel lanceolato-elliptica, 10–14 cm. longa, 3.5–5.5 cm. lata, apice acuminata vel abrupte acuminata, basi

acuminata, membranacea, minute crenulata, subintegra, subtus novella minute stellato-pubescentia, glabrata; inflorescentia axillaris, pauciflora, paniculata, longe pedunculata, 9–17 cm. longa, glabrata; pedicelli fructiferi 7–9 mm. longi; flores umbellati; sepala punctata, triangularia vel anguste triangularia, 0.75–1 mm. longa, acuta; fructus subglobosi.

MEXICO: Guerrero, Dist. Mina, Aguazarca, arroyo, May 1, 1937, *Geo. B. Hinton 10402* (type, UC; isotype, K; photo and fragment, LL), tree 5 m.

P. Hintonii is known only from rather poor fruiting specimens. Its sepals less than 1 mm. long, very slender long few-flowered inflorescences glabrous in fruit, pedicels thickened above, very thin glabrescent leaves, and slender weak branchlets red-tomentose with minute sessile stellate hairs distinguish the species.

Parathesis latifolia Lundell, sp. nov. Fig. 51.

Frutex, ramuli crassi, minute peradpresse lepidoti; folia petiolis usque ad 1.5 cm. longis stipitata, supra parce papillosa; lamina obovato-elliptica, 15–25 cm. longa, 7.5–9 cm. lata, apice abrupte acuminata, basi cuneata, adulta omnino glabra, chartacea, crenata; inflorescentia axillaris, paniculata, usque ad 10 cm. longa, peradpresse lepidota; pedicelli papilloso-puberuli, 4–6 mm. longi; flores subcorymbosi, minute papilloso-tomentelli, ante anthesin 5 mm. longi; sepala triangularia, 1–1.5 mm. longa, acuta, punctata; petala ca. 6 mm. longa, papilloso-tomentosa, lineato-picta; stamina 3–3.4 mm. longa; filamenta crassa, 1.5–1.7 mm. longa; antherae erectae, lanceolatae, usque ad 2.5 mm. longae, dorso area minute punctata praeditae; ovarium ovoideum, minute tomentosum; ovula 8 vel 9, uniseriata.

MEXICO: Chiapas, near Colonia Tizcao, on the Guatemalan border, in huge sweetgum-oak cloud forest, alt. about 4700 ft., April 23, 1955, *L. Irby Davis & Edgar Kincaid 55–50* (type, TEX), shrub.

Closely akin to *P. Skutchii* Lundell, *P. latifolia* has larger obovate-elliptic leaves abruptly and obtusely short acuminate, flowers twice as large, and anthers conspicuously punctate dorsally and in the lobes. The two have similar indument of all parts, but in *P. latifolia* the petals have a glabrous area above base on inner surface, while they are papillose-tomentose over entire surface in *P. Skutchii*. In both species the ultimate branches of the inflorescence are greatly reduced, sometimes only 1 mm. long.

Parathesis obtusa Lundell, sp. nov. Fig. 52.

Arbor parva, ramuli graciles, novelli parce tomentelli; folia petiolis

Fig. 51. *Parathesis latifolia* Lundell (type, *Davis & Kincaid 55-50*, TEX): 1, flowering branch, × ½; 2, pistil, × 5; 3, petal, inner surface, and stamen, dorsal view, × 5; 4, calyx and pedicel, × 5. Illustrated by Vivien Frazier.

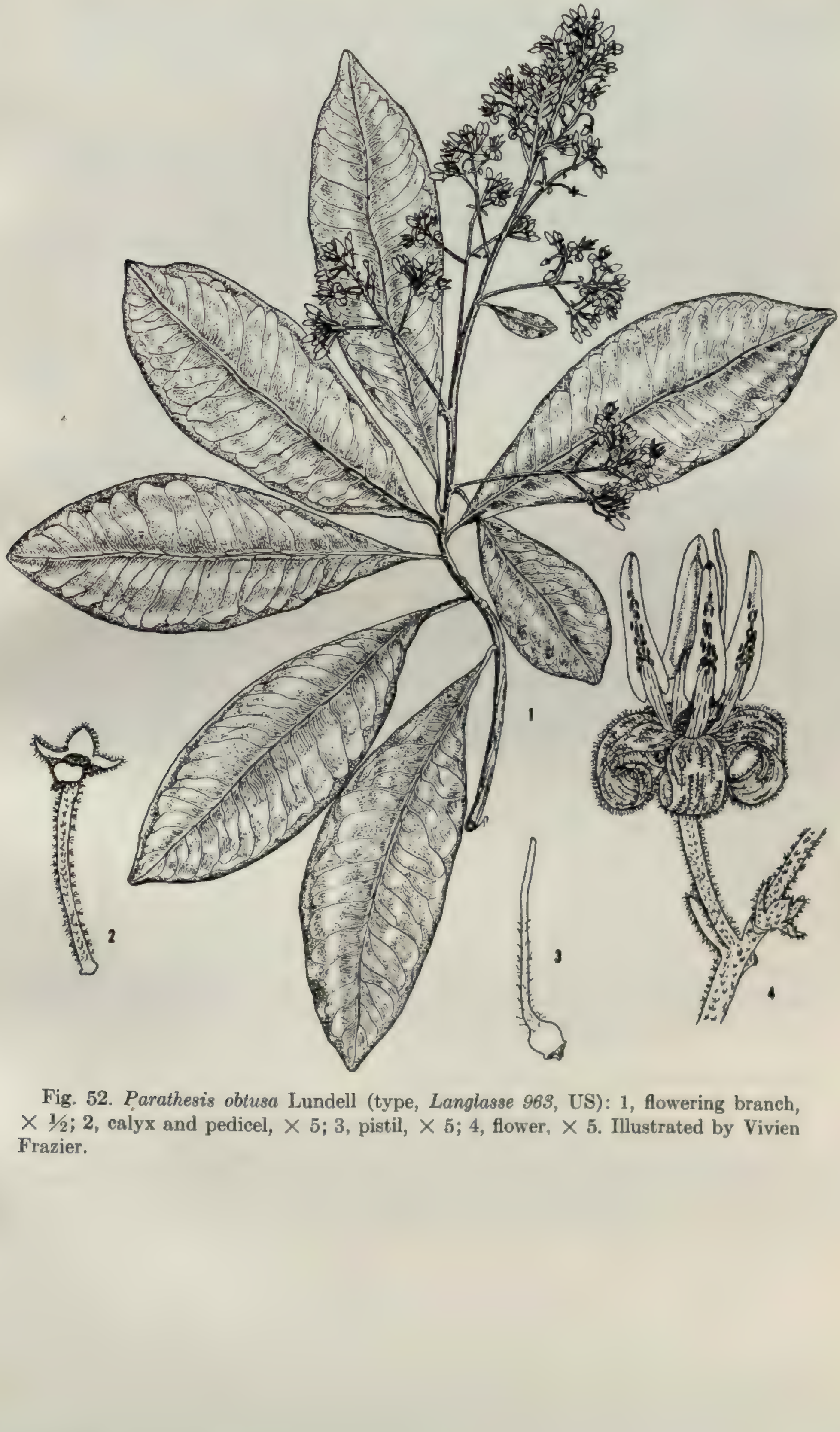


Fig. 52. *Parathesis obtusa* Lundell (type, *Langlasse 963*, US): 1, flowering branch, × ½; 2, calyx and pedicel, × 5; 3, pistil, × 5; 4, flower, × 5. Illustrated by Vivien Frazier.

usque ad 1 cm. longis stipitata; lamina oblanceolata vel oblanceolato-elliptica, usque ad 13 cm. longa, 5 cm. lata, apice late obtusa, basi cuneata, integra, subtus novelli adpresse stellato-pubescentia; inflorescentia terminalis, pyramidalis, paniculata, usque ad 15 cm. longa, tomentulosa; pedicelli usque ad 7 mm. longi; flores 4-meri, corymbosi, ante anthesin usque ad 7 mm. longi; sepala ovato-triangularia, ca. 1 mm. longa, puberula, pellucido-punctata; petala lineari-lanceolata, usque ad 7.5 mm. longa, lineato-picta; stamina usque ad 5.5 mm. longa; filamenta crassa, usque ad 2.3 mm. longa, punctata; antherae erectae, lineari-lanceolatae, usque ad 4.5 mm. longae, dorso area aurantiaco-punctata praeditae; ovarium glabrum; ovula 8, uniseriata.

MEXICO: Michoacan and Guerrero, Los Valles, alt. 800 m., Mar. 24, 1899, *E. Langlasse 963* (type, US).

Like *P. tetramera* Bullock, *P. obtusa* has strictly 4-parted flowers, but the two species do not otherwise resemble each other.

Parathesis stenophylla Lundell, sp. nov. Fig. 53.

Ramuli crassiusculi, adpresse ferrugineo-tomentelli; folia petiolis usque ad 2 cm. longis stipitata; lamina lineari-lanceolata, 10–30 cm. longa, 2.5–5 cm. lata, acuminata, chartacea, crenulato-denticulata, subtus adpresse stellato-pubescentia; inflorescentia axillaris, longe pedunculata, pauciflora, usque ad 23 cm. longa, minute stellato-tomentella; pedicelli 4–8 mm. longi; flores corymbosi, minute tomentelli, nigro-punctata, ante anthesin ca. 5 mm. longi; sepala anguste triangularia, ca. 1.5 mm. longa, acuminata; petala 5–6 mm. longa, lineato-picta; stamina 3–3.4 mm. longa; filamenta glabra, usque ad 2 mm. longa; antherae erectae, lanceolatae, usque ad 2.7 mm. longae, dorso area punctata praeditae; ovarium ovoideum, apice breviter villosum, basi glabrum; ovula 8, uniseriata.

GUATEMALA: Dept. Quiche, 1942, *Jose Ignacio Aguilar 793* (type, F; photo and fragment, LL).

This very distinctive species has very long narrow crenulate-denticulate leaves. Other features are its short filaments, branchlets with persistent fine rusty indument of closely appressed hairs, ovary short villous apically and at base of style, and long lax inflorescences remotely branched.

Parathesis tartarea Lundell, sp. nov. Fig. 54.

Arbor, usque ad 16 m. alta; ramuli crassi, minute ferrugineo-tomentelli; folia petiolis 2–5 cm. longis stipitata; lamina lanceolata vel oblongo-elliptica, 10–30 cm. longa, 2.5–7 cm. lata, apice acuminata vel subabrupte acuminata, basi rotundata et acutiuscula, coriacea, minute denticulata,

Fig. 53. *Parathesis stenophylla* Lundell (type, *Aguilar 793*, F): 1, flowering branches, × ½; 2, calyx, spread out, × 5; 3, pistil, × 5; 4, petal, inner surface, and stamen, dorsal view, × 5. Illustrated by Vivien Frazier.

supra glabrata, subtus minute adpresse stellato-pubescentia; inflorescentia axillaris, paniculata, 5–15 cm. longa, minute ferrugineo-tomentelli; pedicelli crassi, 5–10 mm. longi; flores corymbosi, minute ferrugineo-tomentelli, ante anthesin 5–6 mm. longi; sepala crassa, triangularia, 1.2–1.6 mm. longa, acuta; petala ca. 6 mm. longa, intus papilloso-tomentella, punctata; stamina usque ad 3.75 mm. longa; filamenta crassa, ca. 1.4 mm. longa; antherae erectae, lanceolatae, usque ad 2.75 mm. longae; ovarium ovoideum, glabrum, apice minute tomentellum; ovula 9, uniseriata.

GUATEMALA: Dept. San Marcos, along Quebrada Canjula, between Sibinal and Canjula, Volcan Tacana, alt. 2200–2500 m., Feb. 18, 1940, *Julian A. Steyermark 36023* (type, F; fragment of type and photo, LL; isotype, MICH), tree 50 ft. tall; leaves subcoriaceous, dull green above, tan beneath; petals white within, brownish without.

The rough peeling epidermis of the branchlets, thick petioles up to 5 cm. long, coriaceous leaves pubescent on undersurface with minute stellate appressed hairs, thick peduncle and branches of inflorescence, and fleshy sepals well-mark this notable species. *P. tartarea* occurs in Chiapas also.

Parathesis vulgata Lundell, sp. nov.

Frutex vel arbor parva, ramuli crassiusculi, peradpresse stellato-tomentosi; folia petiolis usque ad 1.5 cm. longis stipitata; lamina oblanceolata vel oblanceolato-elliptica, 7–19 cm. longa, 3–6.5 cm. lata, apice subabrupte acuminata, basi acuminata, membranacea, subintegra vel crenulata, subtus novella adpresse stellato-pubescentia; inflorescentia axillaris bipinnatim paniculata, 6–18 cm. longa, minute papilloso-puberula; pedicelli 5–8, raro 10 mm. longi; flores corymbosi, papilloso-puberuli, ante anthesin 5–6 mm. longi; sepala ovato-triangularia, 1.4–2 mm. longa, acuminata, punctata; petala anguste lanceolata, 5–7 mm. longa, lineato-picta; stamina 3–3.5 cm. longa; filamenta crassa, usque ad 1.5 mm. longa; antherae erectae, ovato-lanceolatae, 2–2.5 mm. longae, apiculatae, dorso area nigro-punctata praeditae; ovarium ovoideum, apice villosum vel villoso-tomentosum; placenta subglobosa, apiculata, ovula 6–9, uniseriata.

HONDURAS: Dept. Morazan, Mt. Uyuca, drainage of the Rio Yeguare, about Long. 87° W, Lat. 14° N, cloud forest, alt. 6300 ft., June 16, 1948, *S. F. Glassman 1616* (type, F; isotype, NY), small tree, flowers pink.

P. vulgata has affinity to *P. glabra* Donn. Sm.

Synardisia (Mez) Lundell, gen. nov.

Ardisia, subgen. *Synardisia* Mez, Pflanzenreich IV. 236: 77. 1902.

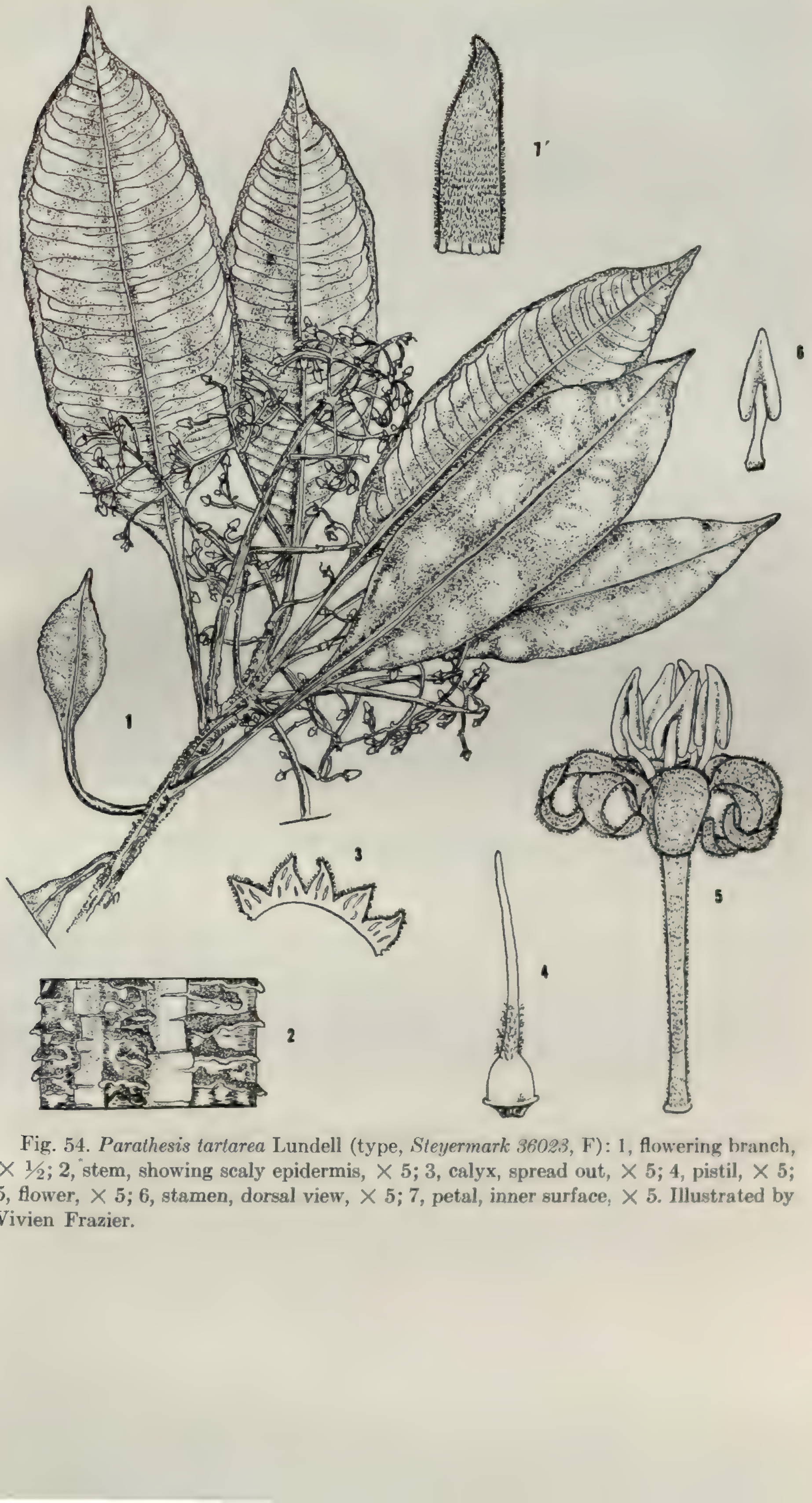


Fig. 54. *Parathesis tartarea* Lundell (type, *Steyermark 36023*, F): 1, flowering branch, × ½; 2, stem, showing scaly epidermis, × 5; 3, calyx, spread out, × 5; 4, pistil, × 5; 5, flower, × 5; 6, stamen, dorsal view, × 5; 7, petal, inner surface, × 5. Illustrated by Vivien Frazier.

The genus is well-marked by the campanulate or suburceolate corolla with petals connate up to three-fourths their length, and by the small included stamens and style.

Synardisia venosa (Mast.) Lundell, comb. nov.

Ardisia venosa Mast. in Donn. Sm., Bot. Gaz. 18: 205. 1893; Mez, Pflanzenreich IV. 236: 77, *fig. 10, A-D.* 1902.

MEXICO: Jalisco, Sierra del Halo, abundant in podocarp forest in barranca, elev. 2000-2200 m., Dec. 3, 1959, *Rogers McVaugh & Walter N. Koelz 1362* (LL, MICH), tree 12–15 m. high, 30–50 cm. diam., fruit purplish black; about 15 miles se. of Autlan, barranca in pine-oak-fir forest, elev. 2400–2600 m., Apr. 12, 1949, *McVaugh 10245* (LL, MICH), flowers deep pink, very fragrant, the lobes white-bordered distally. Guerrero, Dist. Mina, Jan. 5, 1938, *Ynes Mexia 9076* (F, UC, US); Dist. Mina, *Geo. B. Hinton 14167* (LL, US); *15410* (LL, US), tree 20 m., shoots eaten; Dist. Montes de Oca, *Hinton 14039* (LL, TEX, US). Mexico, Dist. Temascaltepec, alt. 2450 m., *Hinton 2765* (F); *3719* (US); *7209* (F, LL, TEX, US); *7539* (F, LL); *7676* (F, LL, US); *11203* (LL, TEX, US), tree 8 m., very fragrant. Chiapas, Mt. Ovando, *E. Matuda 659* (US); Volcan Tacana, 2800 m., *2815* (F, LL); Mt. Male, 3200 m., *4699* (F, LL, US); Siltepec, *5276* (F, LL). GUATEMALA: Dept. Chimaltenango, Chichoy, *W. C. Shannon 369* (US); Chichavac, alt. 2400–2700 m., *A. F. Skutch 344* (F, US); *694* (US); Dept. El Progreso, Sierra de Las Minas, alt. 2500–3000 m., *Julian A. Steyermark 43632* (F, US), fruit purple-black, 1 cm. broad, 8 mm. high, edible; Dept. Huehuetenango, Sierra de los Cuchumatanes, alt. 1500 m., *Steyermark 48847* (F); *51698* (F, US), tree 50 ft. tall, *"pish-match";* Dept. Jalapa, Volcan Jumay, on summit in cloud forest, *Steyermark 32323* (F), epiphyte on tree; Dept. Quezaltenango, Volcan Zunil, alt. 2850 m., *Paul C. Standley 67357* (F, LL); Volcan Santa Maria, alt. 1300–1400 m., *Steyermark 34407* (F), *"flor de lima";* Dept. San Marcos, Volcan Tacana, *Steyermark 36033* (F); *36503* (F, LL), corolla tube coral-rose, lobes white on margins, the lips green, calyx dull green; Volcan Tajumulco, *Steyermark 37110* (F); Dept. Santa Rosa, Santa Rosa, *Heyde & Lux 3021* (US); Dept. Solola, Volcan San Pedro, alt. 8300–9400 ft., *Steyermark 47237* (F), one of dominant trees in upper moist cloud forest; Dept. Zacapa, Sierra de las Minas, *Steyermark 29869* (F); *29948* (F); Dept. Zacatepequez, Volcan Acatenango, alt. 7000 pp., March, 1892, *J. Donnell Smith 2485* (type, US). EL SALVADOR: Dept. Chalatenango, Los Esesmiles, in cloud forest, alt. ca. 2400 m., *John M. Tucker 1157* (F, LL, UC, US), tree 10 m. tall; Dept. Santa Ana, Laguna de las Panas, *Tucker 1243* (F, LL, UC, US); Cerro Monte Cristo, cloud forest near summit, alt. 7000 ft., *Paul H. Allen 7170* (F, US). HONDURAS: Dept. Intibuca, *Antonio Molina R. 6276* (F); *6382* (F); *6406* (F); *7885* (F); Dept. Morazan, near San Juancito, cloud forest, alt. 2000 m., *Molina 1021* (F, GH, US), *8554* (F), tree; Mt. Uyuca, *Molina 2773* (F, GH, US); *Louis O. Williams & Molina 10385* (F, GH); *10707* (F); *15788* (F, GH, US); Dept. Sta. Barbara, Cerro Sta. Barbara, *Paul H. Allen, Robert Armour & Alphonse Chable 6061* (F, US); *6112* (F).

Collectors report that both the young shoots and the berries are edible.

BV0004[illegible]
[illegible]

NOVELTIES IN COLUBRINA INCLUDING CORMONEMA AND HYBOSPERMA (RHAMNACEAE)

F169

MARSHALL C. JOHNSTON[1]

Prior to publication of a revision of *Colubrina*, I present here some of the necessary new combinations, new subgeneric taxa, and new species and varieties.

SUBGENUS COLUBRINA

This subgenus includes two sections, as follows:

SECT. COLUBRINA.

This section includes *C. oppositifolia* Brongn. ex Mann, *C. arborescens* (Mill.) Sarg., *C. rufa* Reiss., *C. nipensis* M. C. Johnst., and *C. cordifolia* Reiss. All these have in common perfectly entire leaves with round glands scattered on the undersurface (the two nearest the petiolar attachment in some species much larger than the rest); the capsules dehisce explosively; the seeds are not keeled on the upper dorsum. *C. elliptica* (Sw.) Brizicky & Stern is included below in the next section of this subgenus, but it actually seems to be intermediate between the two sections and to link them together.

Colubrina rufa Reiss. var. **glandulosa** (Perkins) M. C. Johnst., comb. nov.

Colubrina glandulosa Perkins, Engl. Bot. Jahrb. 45: 465. 1911.

Colubrina rufa Reiss. var. **Reitzii** M. C. Johnst., var. nov.

Varietas varietati typicae simillima, foliis, autem, margines revolutissimos habentibus; venae supra perspicue impressae infra prominentiores; ramuli superiores, petioli, pedunculi, pedicelli, etc. multo parcius pubescentes; thyrsi ramos longiores usque ad 12 mm. long. habentes.

---

[1]Research Associate, Texas Research Foundation; and Assistant Professor and member of the Plant Research Institute, The University of Texas, Austin, Texas.

I wish to acknowledge the help of Dr. Hannah Croasdale in drawing up the Latin diagnoses.

BRAZIL: Santa Catarina, Porto Belo, 50 m. elev., Jul. 15, 1950, *P. R. Reitz 3601* (US 2027883, holotype); Santa Catarina, Asambiya, Brusque, 35 m. elev., May 10, 1951, *Reitz 4024* (US); Santa Catarina, Ibirama, Jan. 26, 1957, *R. Klein 2189* (US).

Colubrina rufa Reiss var. **antillana** M. C. Johnst., var. nov.

Arbores 4–8 m. alt., ramulis ferrugini-tomentosis, laminae 90–215 mm. long., 2.5–3.7 plo longiores quam latae, in apice acutae, coriaceae, infra in vena tomentosae et glandes nigras parvas sparsas, in regionibus submarginalibus praecipue crebrae, habentes, necnon ad basim utroque in latere costae glandem nigram maximam habentes; thyrsi 10–13 mm. long., pedicellis 1–3 mm. long., aut, tempore fructus, ad 5–8 mm. elongatis; fructus semenque tamquam in varietate typica.

DOMINICAN REPUBLIC: Prov. Santiago, Igua, 960 m. elev., very rocky slope, Aug. 12, 1946, *Jose de Js. Jimenez 1178* (US 1883239, holotype); Prov. Monte Cristo, Dist. Sabaneta, La Ceiba, rocky soil on bank of Rio Mao, 400–500 m. elev., Oct. 16, 1930, *E. J. Valeur 475* (US). HAITI: Dept. du Nord, rocky slope west of Marmelade, 800 m. elev., Dec. 20, 1925, *E. C. Leonard 8338* (US). CUBA: Oriente Prov., Sierra Maestra between Rio Yara and Rio Plata, July 12, 1922, *E. L. Ekman 14234* (US).

Colubrina nipensis M. C. Johnst., sp. nov.

Arbores ad 5 m. alt. vel maiores; ramuli tomentum hirsutum pilorum sericeorum atro-castaneorum antrorsorum habentes; folia plerumque subopposita, laminae anguste lanci-ellipticae ad lanceolatas, 8–15 cm. long., 2–6 cm. lat., plerumque 3–4 plo longiores quam latae, in apice longoattenuatae, paululum acuminatae, acutae, coriaceae, integrae, supra fere glabrae infra secundum venam tomentosae, glandem parvam subnigram utro in latere costae ad basim habentes, glandibus aliis manifestis nullis; petioli 5–15 mm. long., 1–2 mm. crass.; stipulae subulatae, 2–3 mm. long., thyrsi 5–10 mm. long., aliquot flores habentes; pedunculi c. 1 mm. long.; pedicelli c. 2–3 mm. long., tempore fructus ad 7–12 mm. elongati, stylus per partem quartam longitudinis ter divisus, divisionibus attenuatis; fructus 6–7 mm. long. (c. parte tertia per poculum persistens obtecta), c. 7–8 mm. crass., abruptissime dehiscens; semen fere orbiculosum, c. 4 mm. diam., compressissimum, atrum nitidum ad basem incisum.

CUBA: Oriente Prov., Sierra de Nipe, elev. 500-700 m., Oct. 16–17, 1941, *C. V. Morton & J. B. Acuna 3065* (US 1782836, holotype); Dec. 5, 1909, *J. A. Shafer 3010 & 3034* (US); July, 1941, *R. A. Howard 6177* (US).

SECT. **Vellozia** M. C. Johnst., sect. nov.

Ramuli spinescentes, foliis integris, lamina basi biglandulosa.

Type species, *C. Vellozii* R. S. Cowan.

This section includes *C. elliptica* (Sw.) Brizicky & Stern, *C. viridis*

(M. E. Jones) M. C. Johnst., *C. verrucosa* (Urb.) M. C. Johnst., *C. Urbanii* M. C. Johnst., *C. heteroneura* (Griseb.) Standl., *C. spinosa* Donn. Sm., and *C. Vellozii* R. S. Cowan. In these plants the margins of the leaves are perfectly entire and the glands are few and confined to the proximal margins; the plants are usually armed with short thorn-tipped branchlets on the bases of which on either side are the compact, sessile, many-flowered thyrses; the dehiscence of the fruits is not explosive, and the distal part of the convex dorsum of the seeds is roundly crested ("hump-backed," as Urban said in the name of his genus *Hybosperma*, which is here reduced).

Colubrina viridis (M. E. Jones) M. C. Johnst., comb. nov.

Phyllanthus viridis M. E. Jones, Contr. West. Bot. 18: 47. 1933.
Colubrina glabra Wats., Proc. Amer. Acad. 24: 44. 1889, not Nuttall, Sylv. 2: 49. 1846.

Colubrina verrucosa (Urb.) M. C. Johnst., comb. nov.

Hybosperma verrucosum Urb., Arkiv foer Botanik 20A, 15: 73. 1926.

Colubrina Urbanii M. C. Johnst., nom. nov.

Hybosperma spinosum Urb., Symb. Antill. 1: 358. 1899, not *Colubrina spinosa* Donn. Sm., Bot. Gaz. 23: 4. 1897.

Colubrina spinosa Donn. Sm. var. **mexicana** (Rose) M. C. Johnst., comb. nov.

Cormonema mexicanum Rose, Contr. U. S. Nat. Herb. 3: 315. 1895 (as "*mexicana*").

Colubrina Vellozii R. S. Cowan var. **latifolia** (Reiss.) M. C. Johnst., comb. nov.

Cormonema spinosum Reiss. var. *latifolium* Reiss., Mart. Fl. Bras. 11^1: 96. 1861.

Colubrina Vellozii R. S. Cowan var. **Sprucei** (Suesseng.) M. C. Johnst., comb. nov.

Cormonema Sprucei Suesseng., Bot. Archiv. Konigsberg, 39: 387. 1939.

Colubrina Vellozii R. S. Cowan var. **paranensis** M. C. Johnst., var. nov.

Varietas varietati *latifoliae* simillima, foliis, autem, lucidius viridibus, magis membranaceis, stipulas usque ad 7 mm. long., et aculeos magis aciculatos habentibus; pubescentia rubiginosa internodorum iuniorum laxior hirsutior rufior, pedicelli solum 1–2 mm. long., poculum floris 3 mm. diam.

ARGENTINA: Corrientes, Dept. Empedrado, Estancia Las Tres Marias, thickets on low ground by Rio Parana, May 11, 1957, *T. M. Pedersen 4563* (US 2283471, holotype); Misiones, Posadas, by Rio Parana, "La Granja," Nov. 1907, *E. L. Ekman 1464* (US); Misiones, Dept. San Pedro, El Alcazar, Mar. 30, 1949, *T. Schwindt 1366* (US).

SUBGENUS SERRATARIA M. C. Johnst., subgen. nov.

Laminae foliorum glandulari-serratae; rami styli attenuati.

This subgenus, which has no clear relationship with the nominate subgenus, includes two sections, as outlined below:

SECT. SERRATARIA.

This section includes *C. californica* I. M. Johnst., *C. texensis* (T. & G.) A. Gray, *C. macrocarpa* (Cav.) G. Don, *C. stricta* Engelm. ex Blankinship, *C. sordida* M. C. Johnst., *C. Greggii* S. Wats., *C. celtidifolia* (Cham. & Schlecht.) Schlecht., *C. Berteroana* Urb., and *C. cubensis* (Jacq.) Brongn. (type species of the subgenus). These species have in common very thick-walled, tardily deciduous fruits, and numerous small glandular-mucronate teeth at the leaf-margins.

Colubrina texensis (T. & G.) A. Gray var. **pedunculata** M. C. Johnst., var. nov.

Varietas varietati typicae simillima, ramulis, autem, rectioribus, foliis solidioribus in apice saepius acuminatis, venis manifestioribus, 3–5 paribus venarum secondariarum a costa divergentibus, 15–30 dentibus marginalibus utroque in latere; thyrsi pedunculos pubescentes c. 1 mm. long. necnon cymas compactas habentes, cymis pedicellos 1–2 mm. long., 1 mm. crass., tempore fructus ad 5 mm. long. factos, habentibus.

MEXICO: Coahuila (?), mountains west of Jimulco, Apr. 27, 1885, *C. G. Pringle 144* (US, holotype).

It is possible that the collection was actually made just within the Durango border instead of in Coahuila, since Pringle states (in his published field notes) that he walked four miles west of Jimulco across the valley to a great canyon in the mountains; the valley referred to may be that of the Rio Aguanaval, which forms the Coahuila-Durango state line just west of Jimulco. The variety is otherwise known from several collections from southern Coahuila and eastern Durango.

Colubrina macrocarpa (Cav.) G. Don var. **macrocarpoides** (Suesseng. ex Suesseng. & Overk.) M. C. Johnst., comb. nov.

Colubrina Greggii S. Wats. var. *macrocarpoides* Suesseng. ex Suesseng. & Overk., Fedde Rep. Sp. Nov. 50: 325. 1941.

Colubrina macrocarpa (Cav.) G. Don var. **lanulosa** (Blake) M. C. Johnst., comb. nov.

Colubrina lanulosa Blake, Contr. Gray Herb. 52: 74. 1917.

Colubrina sordida M. C. Johnst., sp. nov.

Frutices c. 4 m. alt. (*Ynes Mexia 8854*); ramuli graciles arcuati, tomento hirsuto denso pilorum sericeorum antrorsorum fuscorum obtecti; folia alternata aut summa subopposita; laminae ovatae 8–13 cm. long., 5–9 cm. lat., ad basim rotundatae ad apicem acutae atque paulum acuminatae, in margine microscopicaliter appressae glandulari-serrulatae, infra tomentum densum implexum pilorum sericeorum fuscorum habentes, supra obscuriores, pubescentiam multo parciorem strigosam pilorum subappressorum albo-sericiorum habentes, necnon 2 venis primariis basalibus vix prominentioribus quam 4–6 paria venarum secondariarum a costa divergentibus praeditae; venae tertiae percurrentes; petioli 7–22 mm. long.; stipulae subulatae, caducae; thyrsi erecti, 20–30 flores habentes, 3–5 cm. long., in pedunculis tomentosis usque ad 3 cm. long., 2 mm. crass.; pedicelli 2–6 mm. long., tempore fructus ad 5–10 mm. elongati; poculum c. 4 mm. lat., tomento fusco-sericeo hirsutum, postea glabratum; fructus c. 15 cm. long (⅓–¼ longitudinis per poculum persistens obtectus), fere sphericus, non profunde tricoccus, tarde schizo-loculicidalis; semina c. 9 mm. long., 8 mm. lat., multum turgida lentaque, admodum sine endospermate, cotyledonibus oleaginosis crassissimis subflavis.

MEXICO: Guerrero, Distr. Adama, Sierra Madre del Sur, north of Rio Balsas, Temisco, Barranca de la Guacamaya, dry slope above stream, Nov. 19, 1937, *Ynes Mexia 8854* (US 1748626, holotype; LL); Guerrero, Achotla, Aug. 1926, *B. P. Reko 4958* (US 1269532).

Colubrina Greggii S. Wats. var. **yucatanensis** M. C. Johnst., var. nov.

Varietas varietati simillima, laminae, autem, media in parte non prope basim latissimae, plus quam duplo longiores quam latae, angulo apicali 35°–90°, solummodo acuto non acuminato, dentibus marginalibus minutissimis, minus discernibilibus quam in varietate typica.

MEXICO: Yucatan, Chichen Itza, near Sacred Cenote, in low second growth, May 29, 1938, *C. L. Lundell & Amelia A. Lundell 7310* (LL, holotype; US).

This variety is known from many collections from the state of Yucatan, and two from the Department of Peten, Guatemala.

Colubrina cubensis (Jacq.) Brongn. var. **Ekmanii** M. C. Johnst., var. nov.

?Colubrina obtusata Urb., Fedde Rep. Sp. Nov. 18: 116. 1922.

Frutices aut parvae arbores; laminae anguste ovato-oblongae ad lanci-oblongas, 40–90 mm. long., 11–27 mm. lat. plerumque 2–3 plo longiores quam latae, in apice rotundatae ad acutas, mucronatae, in margine revo-

lutissimae, obscurissime glandulari-crenulatae, supra infraque tomentosae, 5–6 paribus venarum secondariarum e costa divergentibus; venae tertiariae valde regulariter percurrentes; petioli 4–9 mm. long., c. 1 mm. crass.; thyrsi florescentes c. 2 cm. long., pedunculi 5–10 mm. long., tempore fructus ad 10–20 mm. elongati; pedicelli 1–4 mm. long., tempore fructus ad 4–6 mm. elongati; styli 3-partiti per c. dimidium longitudinis; fructus 7–9 mm. long., poculo paulo longiore quam tertia pars longitudinis fructuum; semina 4–5.5 mm. long., atra, lucentia.

CUBA: Oriente Prov., Santiago de Cuba prope El Morro ad viam, Jun. 9, 1918, *E. L. Ekman 9205* (US, holotype); Camaguey, Pastelillo beyond Nuevitas, Mar. 15–16, 1909, *J. A. Shafer 1047* (US).

Colubrina cubensis (Jacq.) Brongn. var. **floridana** M. C. Johnst., var. nov.

Frutices ad 2 m. alt. vel maiores; laminae anguste ellipitico-oblongae ad lanci-oblongas, 5–10 cm. long., 12–38 mm. lat., plerumque 2.5–3 plo longiores quam lat., ad basim rotundatae, ad late cuneatas, in apices rotundatae ad acuminatas, in marginibus paululum revolutae necnon obscure crenulato-serrulatae, omni dente vestigiali mucronem glandularem microscopicum deciduum praegente, laminae solidae, non, autem, coriaceae, utroque in latere tomentosae, 7–9 paribus venarum secondariarum a costa divergentibus, venis tertiariis percurrentibus; petioli 2–12 mm. long., c. 1 mm. crass., thyrsi 1–2 cm. long. in pedunculis gracilibus, styli ter divisi per tertiam partem longitudinis; pedicelli tempore fructus ad 7–8 mm. elongati; fructus c. 8 mm. long., fere spherici, longe persistantes, semina satis compressa, 4–5 mm. long.

UNITED STATES: Florida, Dade Co., Lewis-Nixon hammock, Redlands district, Feb. 2, 1930, *H. N. Moldenke 553* (US, holotype).

The variety is known from abundant collections from southern Florida, where the true var. *cubensis* is not known to occur.

SECT. **Barcena** (Duges) M. C. Johnst., comb. nov.

Barcena Duges, Rev. Cient. Mex. 1: 8. 1879; La Naturaleza 4: 281, *t. 10.* 1879, as a genus.

To this section belong *C. glomerata* (Benth.) Hemsl., *C. Ehrenbergii* Schlecht, *C. asiatica* (L.) Brongn., *C. pedunculata* Baker f., *C. anomala* King, *C. Beccariana* Warburg, and *C. travancorica* Beddome. No new nomenclature is required in this section at this time.

VOLUME 3 DECEMBER, 1964 NUMBER 6

WRIGHTIA

A BOTANICAL JOURNAL

CONTENTS

Studies of the American Myrsinaceae—II.
By Cyrus Longworth Lundell..... 97

A Variety of Jacquinia aurantiaca from Peten.
By Cyrus Longworth Lundell..... 114

Notes on the Myrtaceae of Guatemala.
By Cyrus Longworth Lundell..... 115

E 10

PUBLISHED BY
TEXAS RESEARCH FOUNDATION
RENNER, TEXAS

MISSOURI BOTANICAL
MAR 8 - 1965
GARDEN LIBRARY

WRIGHTIA

WRIGHTIA, a botanical journal, is a publication of Texas Research Foundation. The contributions are by staff members and collaborators.

Each volume will contain a series of numbers, to be issued at irregular intervals. The subscription price for Volume 3 is $12.00, postpaid.

VOLUME 3, NUMBER 6
ISSUED DECEMBER 31, 1964

Printed in the U.S.A.
Cayuga Press, Inc.
Ithaca, New York

BY J. F. MACBRIDE
ON TROPICOS HERB. IT

WRIGHTIA

VOLUME 3 DECEMBER, 1964 NUMBER 6

STUDIES OF THE AMERICAN MYRSINACEAE—II

CYRUS LONGWORTH LUNDELL

The preparation of a definitive treatment of the Myrsinaceae for the *Flora of Guatemala* has involved a study of the genera and species of Mexico, Central America, the West Indies and northern South America. Along with transfers and other notes, eight new species and two new genera are described.

Of the seven genera which are found in Guatemala, *Parathesis* Hook.f. and the two new genera, *Gentlea* Lundell and *Yunckeria* Lundell, have been revised. Twenty-nine of the seventy species of *Parathesis* are represented in the flora of the area, which is the center of greatest diversification and speciation in the genus.

Ardisia Swartz, a vast genus in the tropics of the New World and Asia, is represented by twenty species in Guatemala, but the number is considerably higher in Costa Rica. In preparation of the treatment, all the species of *Ardisia* in Mexico and Central America, and most of those in the West Indies have been evaluated. The genera *Stylogyne* A.DC. and *Rapanea* Aubl., with two and three species, respectively, in Guatemala, are primarily South American, with few representatives in Mexico and Central America. The monotypic *Synardisia* (Mez) Lundell is known only from the Maya area.

Plates of the new genera are included in the *Flora of Guatemala*, along with illustrations of several species of each of the older genera.

Ardisia brevipes Lundell, sp. nov.

Frutex, ramulis minute et parce puberulis; folia petiolis 4–6 mm. longis stipitata; lamina anguste elliptica vel lanceolata, 5–8.5 cm. longa, 1.5–3.5 cm. lata, apice obtuse acuminata, basi acuta, crenulata, membranacea, glabra; inflorescentia terminalis, minute puberula; pedicelli 8–10 mm. longi; flores umbellati, ante anthesin 6–7 mm. longi; sepala parva, ovato-elliptica vel oblonga, 1.2–1.75 mm. longa, apice rotundata, parce puberula, ciliolata; petala oblongo-elliptica, 6–6.5 mm. longa, lineata, glabra, apice involuta; stamina ca. 4 mm. longa; filamenta glanduloso-puberula, ca. 1.5

mm. longa; antherae 3–3.3 mm. longae, basi bulbosae; ovarium glabrum; ovula 9–12, pluriseriata, immersa.

MEXICO: Veracruz, Suchilapa, March 10, 1930, *C. D. Mell 576* (type, US; isotypes, F, LL).

Related to *A. nigrescens* Oerst. and *A. Tuerckheimii* Donn. Sm., the species is notable in the group for its subsessile fasciculate inflorescences with the peduncle and branches usually less than 1 mm. long. The flowers, in umbels, are slender pedicellate. The peculiar anthers, bulbous and thick at base and tapering to the slender apex, and the petals involute apically are other unique features of *A. brevipes*.

Ardisia escuintlensis Lundell, sp. nov.

Ramuli graciles, glaberrimi; folia petiolis 1 cm. longis stipitata; lamina oblanceolata vel anguste oblanceolato-elliptica, 7.5–10 cm. longa, 2.8–3.5 cm. lata, apice subacuminata, basi acuta, glabra, integra, chartacea; inflorescentia terminalis, paniculata; pedicelli 3–5 mm. longi; flores 5-meri, racemosi; sepala ovato-lanceolata, ca. 2 mm. longa, glabra, membranacea, epunctata; petala ovato-lanceolata, 4 mm. longa, membranacea, epunctata, glabra; stamina 3 mm. longa; filamenta crassiuscula, ca. 1.5 mm. longa; antherae sagittatae, caudato-acuminatae, ca. 2.75 mm. longae, epunctatae; ovarium glabrum; ovula numerosa, pluriseriata, immersa.

GUATEMALA: Dept. Escuintla, 1942, *Jose Ignacio Aguilar 1679* (type, F).

The only specimen available is fragmentary, consisting of a single flowering twig with only flower buds, but the species is very well marked. *A. escuintlensis* has membranaceous sepals and petals, caudate-acuminate anthers dehiscent longitudinally, and racemose flowers in small terminal panicles which are shorter than the leaves. It is probably related to *A. revoluta* H.B.K.

Ardisia hirtella Lundell, sp. nov.

Frutex, ramulis rufo-hirtellis; folia petiolis 7–15 mm. longis stipitata; lamina lanceolata, 8.5–14 cm. longa, 3–4.7 cm. lata, apice obtuse acuminata, basi acuta, obscure crenulata, membranacea, puberula; inflorescentia corymbosa, multiflora, rufo-puberula; pedicelli 1–1.5 cm. longi; sepala ciliata, 3–3.5 mm. longa; petala minute ciliata, asymmetrica, 7–10 mm. longa, 3–4 mm. lata; fllamenta glabra; antherae apiculatae, ad 4 mm. longae; ovarium glabrum.

BRITISH HONDURAS: El Cayo District, Retiro, in cohune ridge, June 30, 1936, *C. L. Lundell 6302* (type, LL).

Referable to the *A. nigrescens* Oerst. complex, *A. hirtella* is atypical in having glabrous filaments. More significant, its branchlets are rather thinly hirtellous with short red hairs, not hirsute-tomentose as in *A. nigrescens*. The long slender petioles and acute decurrent leaf blades are other minor distinguishing characteristics of *A. hirtella*.

Ardisia hyalina Lundell, sp. nov.

Arbor parva, glabra; ramuli crassiusculi; folia petiolis 1.5–2 cm. longis stipitata; lamina anguste elliptica vel oblongo-elliptica, 15–20 cm. longa, 7–8 cm. lata, utrinque acutiuscula, subintegra, glabra, membranacea, minute punctata; inflorescentia terminalis, tripinnatim paniculata, 13 cm. longa, 16 cm. lata, glabra; pedicelli 1–1.5 cm. longi; flores racemiformi, ante anthesin 7–8 mm. longi; sepala hyalina, libera, ovato-elliptica, 2–2.3 mm. longa, ciliolata, parce nigro-punctata; petala hyalina, elliptica, 6.5–7.5 mm. longa, parce lineata, basi connata ca. 2 mm., intus prope basin glanduloso-papillosa; stamina 4.5–5 mm. longa; filamenta glabra, 3.4–3.8 mm. longa; antherae ovato-oblongae, 2–2.4 mm. longae, epunctatae; ovarium minute punctatum; ovula numerosa, pluriseriata, immersa.

MEXICO: San Luis Potosi, vicinity of Xilitla, Cerro Miramar, in subtropical Miramar forest with high precipitation, alt. 4400 ft., July 15, 1947, *Robert J. Newman 19* (type, US), a small tree about 13 ft. tall, the bark tannish gray, fairly smooth but flecked with small dark rough spots, the flowers pink.

The hyaline calyx and corolla are distinctive. Its slender pedicels, thin punctate elliptic leaves with small raised glands on both surfaces, and racemiform inflorescences further serve to set apart *A. hyalina* as one of the best marked in Mexico. The relationships of this unique species are uncertain.

Ardisia nigrescens Oerst. var. **Donnell-Smithii** (Mez) Lundell, comb. nov.

Ardisia Donnell-Smithii Mez, Bull. Herb. Boiss. II. 3: 235. 1903.

The plants with large mostly subentire elliptic or obovate leaves, usually obtusish to rounded at base, and with venation rather conspicuous are typical of *A. nigrescens* var. *Donnell-Smithii*. These intergrade into the smaller leaved types. The variety is quite limited in distribution, being known only from Chiapas, Alta Verapaz and southern British Honduras, while the species ranges northward from Guatemala into Oaxaca, Veracruz and San Luis Potosi.

Ardisia pellucida Oerst. var. **pectinata** (Donn. Sm.) Lundell, comb. nov.

Ardisia pectinata Donn. Sm., Bot. Gaz. 12: 132. 1887.

The typical *A. pellucida* plants have leaves, sepals and ovary densely black-punctate with small rounded elevated glands. *A. pellucida* var. *pectinata* is sparingly punctate with large glands, and in this feature quite distinctive.

Ardisia sessiliflora Lundell, sp. nov.

Arbor parva; ramuli crassiusculi, novelli minute ferrugineo-tomentelli; folia petiolis usque ad 1 cm. longis stipitata; lamina oblanceolato-elliptica vel anguste oblongo-elliptica, 16–22.5 cm. longa, 4–6.5 cm. lata, apice obtusa, basi attenuata, integra, subcoriacea, glabra, pallida, minute punctata; inflorescentia terminalis, bipinnatim paniculata, usque ad 12 cm. longa, ferrugineo-tomentulosa; flores spicati, ante anthesin usque ad 9 mm. longi; pedicelli raro ad 2 mm. longi; sepala carnosa, quincuncialia, oblongo-elliptica, 3–4 mm. longa, ciliata, punctata, rugulosa, intus minute glanduloso-papillosa; petala carnosa, oblongo-elliptica, usque ad 9.5 mm. longa, basi connata ca. 4.5 mm., lineata, intus glabra; stamina 7–8 mm. longa; filamenta glabra, ca. 5 mm. longa; antherae lanceolatae, 3–3.5 mm. longae, cuspidatae, dorso area nigro-punctata praeditae; ovarium glabrum; ovula numerosa, pluriseriata, immersa.

MEXICO: Nayarit, about 1.5 miles west of Mazatan on road to Las Varas, wooded pastured slopes and small barrancas, elev. about 600 m., Aug. 27–29, 1959, *Charles Feddema 1064* (type, LL; isotype, MICH), tree 5 m. high, trunk 4 cm. diam., spreading crown, flowers white.

A remarkably distinct species related to *A. densiflora* Krug & Urb., but with spicate fleshy flowers nearly twice as large. The large calyx, corolla eglandular within, petals connate into tube at least 4.5 mm. long, and the cuspidate anthers further distinguish the species. *A. revoluta* H.B.K. of the same area does not have a fleshy calyx, and its petals are connate only at base. *A. revoluta* usually has long-pedicellate flowers.

Gentlea Lundell, gen. nov.

Ardisia Swartz, subgen. *Walleniopsis* Mez, Pflanzenreich IV. 236: 77. 1902.

Frutices vel arbores foliis alternis, petiolatis; inflorescentiae terminales paniculatae, breviter pedunculatae vel subsessiles, subcorymbosae vel subracemosae; bracteae parvae; flores hermaphroditi, 5-meri, raro 4- vel 6-meri, sepalis imbricatis vel fere apertis, petalis ultra 1/4 vel medium usque connatis, lobis apertis vel subimbricatis; filamenta longissima petala multo superantia; antherae parvae, cordatae; ovarium ovoideum vel subglobosum stylo gracillimo perlongo, stigmate minuto; placenta pauciovulata vel multiovulata, ovula pluriseriata; fructus subglobosus.

Type species: *Gentlea venosissima* (Ruiz & Pavon) Lundell.

For an understanding of the Myrsinaceae, a re-examination of the generic limits is overdue, and unfortunately this must be done piecemeal. It is obvious that the number of ovules and their arrangement in one or more series is not an entirely satisfactory basis for separating either tribes or genera, but no better basis has been found.

From my rather limited studies, the stamen characteristics, particularly the similarity of anthers in natural groups, appear to provide a helpful guide in classification, especially in making generic distinctions.

In *Gentlea* the long exserted stamens with minute dorsifixed cordate anthers are unique, and distinguish it from *Ardisia* proper. From *Wallenia* Swartz, the genus *Gentlea* is separable by its perfect flowers and elongated style. Mez (l.c.) recognized this group as the subgenus *Walleniopsis* of *Ardisia*. Although Mez (l.c.) stresses that the petals are valvate, the corolla lobes in bud overlap, at least at base, and must be considered imbricate. It is worthy of note that the flowers of *Gentlea* range from green to white.

Pertinent to the recognition of *Gentlea* as a distinct genus is the caustic observation of Macbride (Field Mus. Bot. 13: 186. 1959) in connection with his discussion of the type species, *Ardisia venosissima:* "The species is aberrant here in stamen character and points up the intransigeance of the generic boundaries assigned by botanists."

The genus ranges from western Mexico (Jalisco) south to Peru.

The genus commemorates Percy H. Gentle, botanical explorer of British Honduras.

Key

Branchlets furfuraceous; leaves small, mostly obovate, 2–4 cm. long, coarsely crenate-dentate above the middle or subentire.....1. *G. Vatteri.*

Branchlets glabrous, ferruginous-puberulent or minutely and densely rufous-tomentose.

Sepals incrassate, concave, scarcely 1 mm. long; branchlets minutely rufous-tomentose.....2. *G. venosissima.*

Sepals thin, 1.5–3 mm. long; branchlets glabrous or ferruginous-puberulent at first.

Leaves small, 2.5–7 cm. long, 1–2.5 cm. wide, the apex obtuse or subacuminate.....3. *G. minor.*

Leaves usually large, 6–13 (23) cm. long, 1.5–5.5 cm. wide, the apex acuminate or subabruptly acuminate.

Inflorescences glabrous; corolla glabrous on outer surface .....4. *G. tacanensis.*

Inflorescences glandular-puberulent; corolla usually glandular-lepidote on outer surface.

Flowers small, less than 5 mm. long; anthers about 0.4 mm. long.....5. *G. McVaughii.*

Flowers up to 9 mm. long; anthers 0.6–1 mm. long .....6. *G. micrantha.*

1. **Gentlea Vatteri** (Standl. & Steyerm.) Lundell, comb. nov.

Ardisia Vatteri Standl. & Steyerm., Field Mus. Bot. 23: 220. 1947.

A shrub of 1–3 meters, densely branched, the branchlets brown-furfuraceous, glabrate in age, densely leafy; leaves very small, the marginate petioles 3–5 mm. long; leaf blades oblanceolate, obovate-elliptic or elliptic, 2–4 cm. long, 0.8–1.8 cm. wide, apex obtuse or acute, base cuneate, coarsely crenate-dentate above the middle or sometimes subentire, glabrous above, sparsely and minutely brownish-lepidote beneath or almost glabrous, the costa slender and prominent beneath, subimpressed above, the lateral nerves inconspicuous beneath, obscure above; inflorescences terminal, small, few-flowered, corymbiform, simply branched, scarcely more than 2.5 cm. long, glandular-puberulent, leafy-bracted at the base, the upper bracts oblong, obtuse, 4 mm. long or shorter; pedicels slender, erect, 3–9 mm. long, glandular-puberulent; flowers about 6 mm. long, including exserted stamens; sepals 5, almost free, oblong-lanceolate, 1.8 mm. long, acutish or obtuse, punctate, glandular-ciliolate; corolla greenish-white, 3.2–4 mm. long, the petals united one-third at base, minutely glandular-puberulent within the tube, oblong-lanceolate, obtuse at apex, obscurely punctate and minutely papillose, the margin glandular-ciliolate; stamens 5, free, up to 6 mm. long, attached about middle of corolla tube; filaments slender, glabrous, 4–5.5 mm. long; anthers minute, ovate-cordate, about 0.7 mm. long, black-punctate dorsally with several minute glands; ovary ovoid, glabrous; style slender, 4.5–5.5 mm. long; placenta small, ovoid, apiculate; ovules 7, large, pluriseriate, immersed; fruit globose, drying 4 mm. in diameter.

GUATEMALA: Dept. El Progreso, Sierra de las Minas. between Finca Piamonte and summit of Volcan Santa Luisa, at and below summit in cloud forest, alt. 2400–3333 m., Feb. 5, 1942, *J. A. Steyermark 43555* (F, US), shrub 5–10 ft. tall, fruit dull red, calyx dull greenish, leaves fleshy-subcoriaceous, dull green and shining above, silvery green beneath; Dept. Chiquimula, middle slopes of Montaña Norte to El Jutal, on Cerro Brujo, se. of Concepcion de las Minas, in cloud forest, alt. 1700–2000 m., Nov. 2, 1939, *Steyermark 31023* (F, US); Dept. Zacapa, between Loma El Picacho and Cerro de Monos, alt. 2000–2600 m., Jan. 16, 1942, *Steyermark 42810* (F), *42834* (F,

US), shrub, fruit with pungent odor, dull red and shining; Dept. Huehuetenango, Cerro Huitz, between Mimanhuitz and Yulhuitz, Sierra de los Cuchumatanes, alt. 1500–2600 m., July 14, 1942, *Steyermark 48558* (type, F; isotype, US), shrub 3–5 ft. tall, calyx pale greenish outside, greenish-white within, filaments white, anthers brick-brown; on the trail to Barillas and near the pass between Santa Eulalia and Puente Alto, alt. 8400 ft., Dec. 31, 1945, *A. J. Sharp 45104*3 (F).

EL SALVADOR: Dept. Santa Ana, Cerro Miramundo, above Hacienda Los Planos, ne. of Metapan. alt. 2400 m., Feb. 25, 1946, *Margery C. Carlson 877* (F), shrub, berries green; Cerro Monte Cristo, in primary forest on ridge, alt. 6000-6500 ft., Jan. 17, 1959, *Paul H. Allen 7151* (F, LL, NY), tree to about 12 ft., fruits dark purple.

2. **Gentlea venosissima** (Ruiz & Pavon) Lundell, comb. nov.

- *Caballeria venosissima* Ruiz & Pavon, Syst. 281. 1798.
  Myrsine venosissima (Ruiz & Pavon) Spreng., Syst. 1: 664. 1825.
- *Ardisia breviflora* A.DC., Prodr. 8: 122. 1844.
- *Ardisia Robinsonii* Mez, Pflanzenreich IV. 236: 77. 1902.
- *Ardisia meiantha* Donn. Sm., Bot. Gaz. 44: 115. 1907.
- *Stylogyne phaenostemona* Donn. Sm., Bot. Gaz. 46: 113. 1908.
- *Ardisia venosissima* (Ruiz & Pavon) Macbride, Field Mus. Bot. 13: 186. 1959.
- *Ardisia phaenostemona* (Donn. Sm.) Lundell, Wrightia 3: 78. 1964.

A shrub or tree, the young branchlets usually slender, very minutely rufous-tomentose at first, glabrescent early; leaves with marginate petioles 3–7 mm. long; leaf blades lanceolate, elliptic, or oblanceolate-elliptic, usually small, (4) 7.5–10 (13) cm. long, (1.5) 2.5–4.5 (6) cm. wide, apex obtusish or short acuminate, base acutish and decurrent, chartaceous or subcoriaceous, glabrous, entire, closely veined and conspicuously reticulate on both surfaces, prominently punctate and minutely pitted; inflorescenses usually terminal, usually small and less than 3.5 cm. high, sometimes up to 8 cm. high, the panicles 2- or 3-pinnate, corymbose or subcorymbose-racemose, very minutely ferruginous-puberulent or finely tomentose like the branchlets, sometimes appearing almost glabrous, usually many-flowered and compact; bracts ovate-oblong, up to 7 mm. long, reddish-punctate; pedicels very variable in length, (1) 2–5 (7) mm. long; flowers small, up to 4 mm. long including exserted stamens, (4-) 5- or 6-parted; sepals united fully one-third at base, thick, densely punctate with orange-red or red-black glands, concave, ovate or broadly ovate, 0.75–1 mm. long, with scarious minutely erose-ciliolate margin; corolla 1.75–2 (3) mm. long, the petals connate to middle, ligulate and rounded at apex, ciliolate, punctate with few to many orange-red or red-black glands; stamens exserted, exceeding corolla; filaments united at base, attached to corolla tube above middle, free up to 3 mm.; anthers ovate-cordate, 0.5–0.6 mm. long, dorsifixed, acutish, concolor; ovary subglobose or ovoid; style rigid, 2–2.5 mm. long; placenta ovoid, apiculate; ovules 6–8, in two or more series, immersed; mature fruits black, drying about 5 mm. in diameter.

GUATEMALA: Dept. Alta Verapaz, Coban, alt. 1350 m., June, 1907, *H. von Tuerckheim II. 1814* (type of *Stylogyne phaenostemona* Donn. Sm., US; isotype, NY), a tree; Dept. Quiche, 1942, *Jose Ignacio Aguilar 853* (F); Nebaj, on rocky hill, ca. 4 km. west, alt. ca. 6700 ft., June 11, 1964, *Elias Contreras 4946* (LL), shrub, fruit purple-black; mountain slopes s. of Nebaj, in thickets at base of limestone cliff, alt. 6500–6800 ft., July 19, 1964, *George R. Proctor 25171* (LL), shrub, 2 m., fl. greenish-white; *Proctor 25172* (LL), shrub, 2 m., fr. green, immature; Falls of Rio de las Violetas, 2.5. miles n. of Nebaj, alt. ca. 5500 ft., Aug. 7, 1964, *Proctor 25449* (LL), shrub, 3 m.

COSTA RICA: vicinity of Cartago, alt. 1500 m., April 19, 1906, *William R. Maxon 44* (type of *Ardisia meiantha* Donn. Sm., US; isotype, NY).

VENEZUELA: between Caracas and Colonia Tovar, alt. 6000 ft., Mar. 26, 1857, *A. Fendler 2357* (type of *Ardisia Robinsonii* Mez, GH), fls. yellowish white; State of Merida, between Mucuchachi and Canagua, alt. 1065–1820 m., May 6, 1944, *Julian A. Steyermark 56325* (F, NY).

PERU: Huanuco, Muña, *Ruiz & Pavon* 5/37 (type of *Caballeria venosissima* Ruiz & Pavon, Field Mus. Negatives 8524, 29508); Muña, alt. about 7000 ft., May 23–June 4, 1923, *J. Francis Macbride 3908* (F), a slender shrub in very dense montaña, fruit black; Chachapoyas, *M. Mathews* (F).

Variable in leaf and flower size, all of the collections agree in essential features of flower structure, leaf venation, and pubescence. I have not seen the Ruiz and Pavon type, but from the photographs, there does not appear to be any question about the identity of the species.

3. **Gentlea minor** (Standl.) Lundell, comb. nov.

Ardisia minor Standl., Journ. Wash. Acad. Sci. 17: 522. 1927.

Ardisia Austin-Smithii Lundell, Contr. Univ. Mich. Herb. 7: 36. 1942.

A shrub or small tree, 1.5–10 m. high, the branchlets slender, densely leafy, with short internodes, glabrous; leaves with rather stout marginate petioles 3–7 mm. long, sulcate above, glabrous; leaf blades narrowly elliptic, oblong-elliptic or oblanceolate, 2.5–7 cm. long, 1–2.5 cm. wide, obtuse or subacuminate, often rather abruptly so, the apex obtuse, at base acute or acutely cuneate and decurrent, entire, chartaceous, glabrous, green and dull above with slightly impressed costa, the lateral veins inconspicuous, paler beneath, the costa slender and prominent, the lateral veins slender, the ultimate veins laxly reticulate, punctate; inflorescences terminal, small, shorter than the leaves, few-flowered, bipinnate, glabrous or sparsely and very minutely lepidote-puberulent, the rachis usually 2 cm. long or shorter; bracts caducous thin, obovate, up to 7 mm. long, erose; the flowers umbellate, usually 5- or 6-parted, sometimes 4-parted; pedicels rather stout, 2–2.5 mm. long, calyx usually sparsely and minutely lepidote, and punctate; sepals nearly distinct, ovate-orbicular, ovate or oblong-lanceolate, 1.5–2 mm. long, broadly rounded, obtuse or acute, margins scarious and erose, punctate with few orange-red glands; corolla minutely lepidote, 3–4.2 mm. long, connate at base into tube up to 1.2 mm. high; petals narrowly tri-

angular-lanceolate or oblong-elliptic, apex obtuse, asymmetric, punctate medially above with small orange-red glands; stamens attached slightly above base of corolla tube, exserted in fully developed flowers, up to 5.5 mm. long, the filaments slender, anthers cordate, 0.4–0.5 mm. long, dorsifixed, obtuse-rounded and minutely apiculate; ovary glabrous or rarely lepidote apically, depressed-globose; style slender, 3.5–4.5 mm. long; placenta ovate, apiculate; ovules 8–10, pluriseriate; fruits globose, black, about 6 mm. in diameter at maturity; endocarp finely costate.

COSTA RICA: Cartago south, alt. 4,300 ft., 1919, *C. H. Lankester K47* (F); mts. southwest of Cartago, June 23, 1923, *H. E. Stork C365* (UC, US); Cerro de Laguna, alt. 1190 m., Nov. 7, 1922, *A. M. Brenes 3735* (F); La Palma de San Ramon, alt. 1160 m., Nov. 23, 1923, *Brenes 3952* (F); vicinity of Santa Maria de Dota, Provincia de San Jose, in oak forest, alt. 1500–1800 meters, Dec. 14–26, 1925, *Paul C. Standley 41621* (US), tree 20 ft., fruit black; Laguna de la Chonta, northeast of Santa Maria de Dota, Provincia de San Jose, in dense wet forest, alt. 2000–2100 m., Dec. 18, 1925, *Standley 42306* (US), shrub 10–15 ft., fruit dark red; oak forest near Quebradillas, about 7 km. north of Santa Maria de Dota, Provincia de San Jose, alt. 1800 m., Dec. 24, 1925, *Standley 43040* (US), tree 15 ft., fruit dark purple; dry oak forest, vicinity of Santa Maria de Dota, Provincia de San Jose, alt. 1500–1800 m., Dec. 26, 1925–Jan. 3, 1926, *Paul C. Standley & Juvenal Valerio 43456* (US), *43467* (US), shrub 5–6 ft., fruit black, juicy; in wet forest, Yerba Buena, northeast of San Isidro, Provincia de Heredia, alt. 2000 m., Feb. 22, 28, 1926, *Standley & Valerio 50134* (US), shrub 8–10 ft.; in wet forest, Cerros de Zurqui, northeast of San Isidro, Provincia de Heredia, Mar. 3, 1926, alt. 2000–2400 m., *Standley & Valerio 50571* (type, US), *50590* (US), shrub 8–12 ft., leaves shiny, fruit reddish green; in wet forest, Cerro de las Caricias, north of San Isidro, Provincia de Heredia, alt. 2000–2400 m., Mar. 11, 1926, *Standley & Valerio 52408* (F, US), shrub 5–6 ft.; La Palma de San Ramon, Jan. 12, 1928, *Brenes 5994* (F); in forest, one mile southeast of Agua Caliente, two miles south of Cartago, Prov. Cartago, alt. 4850 ft., Feb. 26, 1928, *Harvey E. Stork 1046* (F, UC), small tree up to 30 ft. tall; Cerro Jucosal, alt. 5200 ft., Mar. 2, 1928, *Stork 1096* (F), common small tree; Piedades (La Palma) de San Ramon, Mar. 25, 1931, *Brenes 13592* (F); Palmira, region of Zarcero, alt. 6300 ft., Dec. 9, 1937, *Austin Smith A673* (type of *Ardisia Austin-Smithii* Lundell, MICH; isotype, F), shrub 5 ft., fls. 5-parted, petals opening to form a star, pure white, no odor.

The flowers of the type of *A. Austin-Smithii* are larger than those of the type of *A. minor*, and additional collections of flowering material are needed to determine the significance, if any, of this difference. Of the specimens examined, only five collections are in flower.

4. **Gentlea tacanensis** (Lundell) Lundell, comb. nov.

Ardisia tacanensis Lundell, Contr. Univ. Mich. Herb. 4: 21. 1940.

A shrub, 1.5–4.5 meters high, the branchlets rather slender, glabrous; leaves with short marginate petioles up to 7 mm. long; leaf blades narrowly oblanceolate or oblong-oblanceolate, 6–13 cm. long, 1.5–3.5 cm. wide, apex

long-acuminate, attenuate to the decurrent base, inconspicuously crenate-serrate, chartaceous, glabrous, the midvein elevated beneath, slightly impressed above, the primary lateral veins slender and inconspicuous on both surfaces; inflorescences terminal, paniculate, 1- or 2-pinnate, 5 cm. long or less, rather congested, few- to many-flowered, sessile or nearly so, glabrous; pedicels slender, 4–8 mm. long; flowers corymbose, up to 7 mm. long including exserted stamens; sepals 5, nearly free, dextrorsely imbricate, glabrous, ovate-orbicular or ovate, up to 2 mm. long, minutely erose, glandular-ciliolate at first, punctate with small round orange glands; corolla greenish-white, glabrous on outer surface, the petals connate almost to middle, the tube up to 2 mm. long, glandular-puberulent within, the free lobes broadly ovate, up to 2.5 mm. long, rounded at apex, sparsely and minutely punctate; stamens 5, free, opposite the petals and borne at base of tube, up to 6.5 mm. long; filaments glabrous, 4.5–6 mm. long, rather stout; anthers exserted, dorsifixed, ovate and shallowly cordate, 0.7–1 mm. long, apiculate; ovary ovoid, glabrous; style 4–5 mm. long; placenta ovoid; ovules pluriseriate, numerous, immersed; fruits globose, black at maturity, drying 4 mm. in diameter.

MEXICO: Chiapas, west side of Volcan Tacana, alt. 2800 m. Mar. 30, 1939, *E. Matuda S-226* (isotypes, A, F, LL, NY, US).

GUATEMALA: Dept. San Marcos, Volcan Tacana, slopes of barrancos tributary to and bordering Rio Vega, between San Rafael at northeast portion of Volcan Tacana and Guatemala–Mexico line, dry upper slopes, alt. 2500–3000 m., Feb. 21, 1940, *J. A. Steyermark 36366* (F), shrub 8 ft. tall, leaves firmly membranaceous, dark blue-green above, grass green beneath, calyx purple, marginal with white, fruit green tinged with red; Volcan Tajumulco, between town of Tajumulco and Tecutla, 9 miles south and west of Tajumulco, nw. slopes of Volcan Tajumulco, moist shaded slopes along quebrada in barranco, alt. 1800–2500 m., Feb. 27, 1940, *Steyermark 36777* (F), shrub 15 ft. tall, corolla whitish; between Todas Santos and Finca El Porvenir, lower to middle slopes of Volcan Tajumulco, alt. 1300–3000 m., Mar. 1, 1940, *Steyermark 36967* (F), *37006* (F), shrub.

5. **Gentlea McVaughii** (Lundell) Lundell, comb. nov.

Ardisia McVaughii Lundell, Wrightia 3: 77. 1963.

A shrub or small tree, branchlets slender, glabrous; leaves with short marginate petioles 3–8 mm. long; leaf blades oblanceolate or oblanceolate-elliptic, 7–18 cm. long, 2.5–5.5 cm. wide, apex acuminate or subabruptly acuminate, base narrowed and acute, entire, or obscurely crenulate above, glabrous, membranaceous or subchartaceous, slightly paler beneath, the midvein elevated beneath, slightly impressed above, the veins very slender; inflorescences terminal, subsessile, glandular-puberulent, paniculate, 1- or 2-pinnate, subsessile, up to 3 cm. long, 4 cm. wide; bracts thin, linear-oblong, up to 1 cm. long, acuminate, glabrous, punctate; pedicels 2–4 mm.

long, sometimes up to 7 mm. long in fruit, sparsely glandular-puberulent; flowers subcorymbose, usually 5-, sometimes 4- or 6-parted, greenish-yellow; sepals free, lanceolate or oblong-lanceolate, 1.75–2 mm. long, thin, glandular-ciliolate, orange-punctate; petals ovate-lanceolate, 3.5–4 mm. long, united about 1 mm. at base, attenuate to the obtusish apex, densely glandular-lepidote on both surfaces, thin, not punctate; stamens 4.5–5 mm. long, exserted; filaments slender, 4–4.5 mm. long, glabrous, free almost to base of corolla; anthers minute, cordate, about 0.5 mm. long, mucronate, not punctate; ovary subglobose, glandular-puberulent; style slender, up to 4 mm. long; placenta subglobose; ovules pluriseriate, numerous, immersed; fruit depressed-globose, drying about 6 mm. in diameter, black at maturity.

MEXICO: Jalisco, Sierra de Manantlan (15–20 miles southeast of Autlan), sides of steep moist barranca above stream, in pine forest zone, elev. ca. 1700 m., Nov. 7, 1952, *Rogers McVaugh 13999* (LL, MICH), shrub 3 m. high, fruit black at maturity; steep mountains 11–12 miles south of Talpa de Allende, in the headwaters of a west branch of Rio de Talpa, barranca above a rapid clear stream, in dense forest of *Quercus*, *Carpinus*, *Distylium*, *Magnolia*, *Podocarpus*, with pine forest on the ridges above, elev. 1200–1700 m., Oct. 18–19, 1960, *McVaugh 20396* (type, MICH; isotype, LL), abundant shrub 2–3 m. high, flowers greenish-yellow; same locality, Nov. 23–25, 1960, *McVaugh 21400* (LL, MICH), small tree, fruit green.

6. **Gentlea micrantha** (Donn. Sm.) Lundell, comb. nov.

Ardisia micrantha Donn. Sm., Bot. Gaz. 14: 27. 1889, not H.B.K., 1818.
Parathesis micranthera Donn. Sm., Bot. Gaz. 18: 205. 1893, not *Ardisia micranthera* Pitard, 1930.
Ardisia staminosa Lundell, Wrightia 3: 78. 1963.

A shrub or small tree of 6–9 meters, the branchlets stout, minutely ferruginous-puberulent when young, sometimes apparently glabrous; leaves with conspicuously marginate petioles usually less than 1 cm. long; leaf blades oblanceolate, oblanceolate-elliptic or oblong-elliptic, 7.5–23 cm. long, 2.5–6.5 cm. wide, acuminate or subabruptly acuminate, base acutish and decurrent, entire or subentire, subcoriaceous, glabrous, the midvein elevated and conspicuous beneath, impressed above, the veins slender and obscure; inflorescences terminal, broadly paniculate, 1–3-pinnate, 3–8 cm. long, glandular-puberulent, glabrescent; pedicels 3–12 mm. long; flowers greenish-white, corymbose, up to 9 mm. long including exserted stamens; sepals almost free, lanceolate-elliptic or ovate, 2–3 mm. long, thin, sparsely orange-red punctate, ciliolate, glabrous otherwise; petals lanceolate-oblong or oblong-elliptic, 5–6 mm. long, connate 1.5–2 mm. at base, glandular-lepidote or rarely nearly glabrous on outer surface, minutely glandular-puberulent within at base, epunctate or with occasional

small glands; stamens inserted near base of tube, 6.5–8.5 mm. long; filaments slender, glabrous, up to 8 mm. long; anthers cordate or ovate, 0.6–1 mm. long, punctate dorsally with several minute glands, versatile; ovary ovoid, sometimes sparingly glandular-puberulent; style 3–5 mm. long; placenta globose, apiculate; ovules numerous, pluriseriate, immersed; fruits subglobose, up to 8 mm. in diameter at maturity, coarsely punctate.

GUATEMALA: Dept. Alta Verapaz, mountain forest near Coban, alt. 4600 ft., March, 1888, *H. von Tuerckheim 1365* (type, US; isotype, F, GH, LL, NY), a tree; large swamp east of Tactic, alt. 1300 m., Feb. 20, 1942, *J. A. Steyermark 43934* (F), shrub 20 ft. tall, leaves subcoriaceous, rich green above, pale green beneath; Dept. Quiche, San Miguel Uspantan, alt. 6000 ft., Apr. 1892, *Heyde & Lux 3020* (GH, US), Nebaj, ca. 8 km. west, bordering high forest, alt. ca. 7500 ft., June 19, 1964, *Elias Contreras 5056* (LL), shrub, 3 in. diam., 30 ft. high; Nebaj, ca. 9 km. sw., in high forest, alt. ca. 7800 ft., June 20, 1964, *Contreras 5072* (LL), shrub, 7 ft., fruit red-purple; Nebaj, ca. 7 km. sw., in low forest, alt. ca. 7000 ft., *Contreras 5087* (LL), shrub, 8 ft. high; Nebaj, ca. 10 km. west, in high forest, alt. 8000 ft., July 3, 1964, *Contreras 5174* (LL), tree, 12 in. diam., 60 ft. high, fruit reddish-brown, "*pucze*"; Dept. El Progreso, hills north of Finca Piamonte, between Finca Piamonte and summit of Volcan Santa Luisa, alt. 2400–3333 m., Feb. 5, 1942, *Steyermark 43509* (F), small tree 30 ft. tall, corolla white, calyx pale green; Dept. Huehuetenango, Cerro Huitz, between Mimanhuitz and Yulhuitz, Sierra de los Cuchumatanes, alt. 1500–2600 m., July 14, 1942, *Steyermark 48629* (F), shrub 20 ft. tall; Cerro Canana, between Nucapuxlac and Canana, Sierra de los Cuchumatanes, alt. 2500–2800 m., July 18, 1942, *Steyermark 49085* (F, US), shrub 25 ft. tall, calyx pale green; wet cloud forest at Cruz de Limon, between San Mateo Ixtatan and Nuca, Sierra de los Cuchumatanes, alt. 2600–3000 m., July 31, 1942, *Steyermark 49840* (F), small tree 30 ft. tall, fruit wine-red; Dept. Zacapa, Sierra de las Minas, cloud forest in ravine bordering Quebrada Alejandria, summit of Sierra de las Minas, vicinity of Finca Alejandria, alt. 2500 m., Oct. 13, 1939, *Steyermark 29894* (F), shrub; Sierra de las Minas, middle and upper south-facing slopes of Volcan Gemelos, alt. 2100–3200 m., Jan. 26, 1942, *Steyermark 43277* (F, US), shrub to small tree, 4–20 ft. tall, the calyx and pedicel pale green, the perianth greenish-white, with lilac or orchid in center or in upper half, the fruit in pendent clusters, shining, globose, 8 mm. in diameter.

HONDURAS: Dept. Morazan, cloud forest, mountains above San Juancito, alt. 2000 m., Feb. 20, 1948, *Louis O. Williams & Antonio Molina R. 13737* (F), tree 4 m., fls. white; same locality, Mar. 25, 1948, *13774* (F, US), tree 6 m., fls. white; cloud forest, Montaña de la Tigra, se. of San Juancito, alt. 2000 m., Feb. 5, 1950, *17099* (F, US); cloud forest near Rancho Quemado, San Juancito Mountains, alt. 2100 m., Oct. 8, 1952, *Louis O. Williams & Rua P. Williams 18641* (F), shrub 3 m. tall.

NICARAGUA: Dept. Matagalpa, cloud forest area ‚Sta. Maria de Ostuma, Cordillera Central de Nicaragua between Matagalpa and Jinotega, alt. 1300-1500 m., Jan. 8–15, 1963, *Louis O. Williams, Antonio Molina R. & Terua P. Williams 23657* (F), fls. white, small tree 4 meters tall.

Parathesis Agostiniana Lundell, sp. nov.

Ramuli crassiusculi, novelli peradpresse ferrugineo-tomentelli; folia petiolis 1–2 cm. longis stipitata; lamina lanceolata, lanceolato-oblonga vel

oblanceolata, 12.5–18 cm. longa, 4–6 cm. lata, apice subabrupte acuminata, basi cuneata, membranacea, crenulata, subtus novella adpresse stellato-pubescentia; inflorescentia terminalis, anguste paniculata, 12–18 cm. longa, adpresse ferrugineo-tomentulosa; pedicelli 2.5–3.5 mm. longi; flores 5-meri, corymbosi, ante anthesin 4–5 mm. longi, puberuli; sepala ovato-triangularia, ca. 1 mm. longa, acuta, pellucido-punctata; petala anguste lanceolata, 4.5–5 mm. longa, pellucido-punctata; stamina 2.5–3 mm. longa; filamenta crassiuscula, usque ad 1.2 mm. longa, glabra; antherae erectae, ovato-triangulariae, usque ad 2.4 mm. longae, dorso area aurantiaco-punctata praeditae; ovarium ovoideum, apice parce hirtellum, basi glabrum; ovula 6–9, uniseriata; fructus globosi, ca. 8 mm. diam.

BOLIVIA: Cerca de La Azulita, about 500 m., May, 1963, *Luis Ruiz Teran 1548* (type, LL).

The collection was made available by Getulio Agostini of the Botanical Institute in Caracas, a student of the South American Myrsinaceae. This distinctive species is named for him.

P. Agostiniana is notable for having pellucid-punctate leaves and flowers, small broad sepals scarcely 1 mm. in length, and anthers conspicuously punctate dorsally with large orange glands.

Parathesis Conzattii (Blake) Lundell, comb. nov.

Ardisia Conzattii Blake, Contr. Gray Herb. n. ser. 53: 64. 1918.

MEXICO: Oaxaca, Dto. Miahuatlan, Los Naranjos, Cercanias de San Pedro el Alto, alt. 2200 m., May 16, 1917, *Conzatti & Reko 3285* (type, GH).

P. Conzattii differs in only minor characteristics from *P. villosa* Lundell. The petals glabrous at base within, large inflorescences, somewhat smaller flowers, and especially the glabrous pistil are features by which *P. Conzattii* may be recognized.

Rapanea myricoides (Schlecht.) Lundell, comb. nov.

Myrsine myricoides Schlecht, Linnaea 8: 525, 1833.
Myrsine guatemalensis Gandoger, Bull. Soc. Bot. Fr. 65: 57. 1918.

At Chicago (F), a fine Ruiz and Pavon specimen (5/33) from Peru, with staminate flowers, is labeled *Caballeria ferruginea* Ruiz & Pavon, and marked "isotypus." On the basis of the original description of *Rapanea Jelskii* (Jahlbr.) Mez, and a photograph of the type (*Jelski 19*) at Vienna, this Peruvian specimen is also typical of that species. A second Ruiz and Pavon collection at Chicago (4/30) also bears the label "isotypus," and is likewise labelled *Caballeria ferruginea*. This has only staminate flower

buds, and its designation as an isotype probably is in error. It is a less pubescent form.

Our plant of Mexico and Central America, long known as *R. ferruginea* (Ruiz & Pavon) Mez, is quite distinct from the species based on the Ruiz and Pavon and the Jelski collections. It ranges from sparsely villous to glabrous, has narrower sharper pointed leaves with slender petioles mostly less than 1.2 cm. long, midvein of leaves not elevated and tomentose above, and smaller flowers. *Myrsine myricoides* Schlecht., described from Jalapa, Veracruz, represents this population, and the name is appropriate for the Mexican and Central American species.

Stylogyne nicaraguensis Lundell, sp. nov.

Frutex glaber, 2–4-metralis; ramuli crassiusculi; folia petiolis 5–15 mm. longis stipitata; lamina anguste oblonga vel oblanceolato-oblonga, 10–18 cm. longa, 3–16 cm. lata, apice subacuminata vel obtusa, basi obtusa vel acutiuscula, chartacea, pallida, integra, punctata; flores ♀ : 5-meri, ante anthesin 5 mm. longi, subcorymbosi; inflorescentia axillaris et raro terminalis, nigro-punctata, paniculata, usque ad 5 cm. longa; pedicelli 3–5.5 mm. longi, lineati; sepala ovata, 1–1.4 mm. longa, nigro-punctata, hyalina; petala oblonga, ca. 4.5 mm. longa, basi connata ca. 1.5 mm., lineata; stamina 3 mm. longa; filamenta 2 mm. longa; antherae ca. 1.4 mm. longae, epunctatae; ovarium ovatum, stylo 2–2.5 mm. longo; ovula 4, uniseriata.

NICARAGUA: Dept. de Zelaya, breñales espesos de La Esperanza, Rio Grande, alt. 0–15 m., April 10, 1949, *Antonio Molina R. 2125* (type, F), fls. blancas, arbusto 2–4 m., común.

With mostly axillary inflorescences, *S. nicaraguensis* bears a close resemblance to *S. laevis* (Oerst.) Mez, but the black-punctate membranaceous sepals and petals, and the conspicuous red-black glands of the inflorescences are very different. In *S. laevis*, the flowers are orange-punctate, and the sepals are thicker. The narrow leaves, small sepals, and filaments in pistillate flowers longer than the anthers are other features which distinguish *S. nicaraguensis*.

In staminate flowers from a 1929 collection, *E. E. Schramm* (F) from Nicaragua, the stamens are 4 mm. long, with filaments fully 3 mm. long. The style scarcely equals the abortive ovary.

Stylogyne Standleyi Lundell, sp. nov.

Frutex vel arbor parva, omnino glabra; ramuli crassi; folia petiolis 1–1.5 (2) cm. longis stipitata; lamina lanceolata vel lanceolato-oblonga, raro oblanceolata, 15–25 cm. longa, 5–9 cm. lata, apice acuminata, basi acuta,

chartacea vel subcoriacea, integra, punctata; flores ♂: 5-meri, ante anthesin ca. 5.5 mm. longi, subcorymbosi; inflorescentia alba, axillaris, paniculata, usque ad 7.5 mm. longa; pedicelli 2–5 mm. longi; sepala aurantiaco-punctata, ovato-elliptica, ca. 1.8 mm. longa, basi connata 1/4; petala aurantiaco-lineata, oblonga, ca. 5.5 mm. longa, oblique emarginata; stamina 6 mm. longa; filamenta ca. 5 mm. longa; antherae lanceolatae, usque ad 1.3 mm. longae, epunctatae; ovarium abortivum, stylo ca. 0.8 mm. longo; ovula 3, uniseriata, minuta.

PANAMA: Barro Colorado Island in Gatun Lake, Canal Zone, alt. 120 meters or less, in wet forest, Nov. 18–24, 1925, *Paul C. Standley 41048* (type, US), shrub 15 ft., leaves deep green, inflorescence white.

The exserted stamens with small anthers and long slender filaments are unique features, clearly distinguishing *S. Standleyi* from *S. laevis* (Oerst.) Mez, which appears to be related. The large leaves, usually widest below the middle, further separate the two.

Yunckeria Lundell, gen. nov.

Frutex vel arbor; folia longe petiolata, integra, punctata, glabra; inflorescentiae paniculatae, ad apices ramorum terminales; flores hermaphroditi, 5-, raro 4-meri, umbellati vel corymbosi; sepala dextrorsum imbricata, basi coalita, rotundata, punctata; petala dextrorsum imbricata, basi breviter in tubum coalita, per anthesin patentia, lineari-oblonga, punctata; stamina petalis paullo breviora; filamenta libera, antheris lineari-lanceolatis, magnis, paullo super basin dorsifixis, apice poratim dehiscentibus, epunctatis; ovarium ovoideum, glabrum, stylo gracillimo perlongo; stigmata punctiforma; ovula uniseriata, compluria (6–8), basi affixa, erecta; fructus globosus, l-spermus; embryo elongatus, transversus.

Type species: *Yunckeria amplifolia* (Standl.) Lundell.

Referable to the Tribe Myrsineae, the genus *Yunckeria* is notable for its large uniseriate ovules standing erect at the base of the placenta. The slender rigid erect anthers dehiscent through apical pores, comparatively long filaments, dextrorsely imbricate petals, elongated style subequaling petals, and the calyx lobed to or below middle and tapering at base into the thickened pedicel serve to further distinguish the genus.

Yunckeria has possible affinity to *Tapeinosperma* Hook.f. of Australia, New Caledonia and the South Pacific islands, on the basis of the arrangement of its ovules. Of the American genera with which it could be confused, *Parathesis* Hook.f. has valvate petals, and *Stylogyne* A.DC. has fewer ovules and corolla contorted in bud. The three species were described in

the genus *Ardisia* Swartz in which the ovules are numerous and pluriseriate.

In recognition of the significant contributions which the late T. G. Yuncker made to Central American botany, the genus commemorates his name.

Key

Leaves elliptic, apex short-acuminate.....1. *Y. Purpusii.*
Leaves obovate or oblanceolate, apex obtuse or rounded and broadly apiculate.
  Leaves pallid, subcoriaceous; pedicels sparsely papillate; sepals about 1.5 mm. long.....2. *Y. ovandensis.*
  Leaves reddish-brown, conspicuously so on undersurface, thin; pedicels glabrous; sepals 2–2.5 mm. long.....3. *Y. amplifolia.*

1. **Yunckeria Purpusii** (Brandegee) Lundell, comb. nov.

Ardisia Purpusii Brandegee, Univ. Calif. Publ. Bot. 6: 189. 1915.

Branchlets stout, terete, the plant entirely glabrous; leaves large with stout marginate petioles 1–2 cm. long; leaf blades elliptic, 17–27 cm. long, 7.5–10 cm. wide, apex short-acuminate, base cuneate or acute and decurrent, entire, thin, subchartaceous, costa shallowly sulcate above, elevated beneath, the veins slender and inconspicuous; inflorescences terminal, tripinnately paniculate, about 8 cm. long; pedicels slender, 8–14 mm. long, thickened above; flowers perfect, corymbose, about 9 mm. long at anthesis; sepals dextrorsely imbricate, ovate, 2 mm. long, obtuse or rounded, rather thick, punctate with a few small black glands, drying with few scattered plate-like glands on dorsal surface; petals dextrorsely imbricate, connate about 3 mm. at base, linear-oblong, 8–9 mm. long, obscurely lineate medially; stamens about 7 mm. long, attached about 1 mm. above base of corolla; filaments about 3 mm. long; anthers dorsifixed about 0.8 mm. above base, linear-lanceolate, 4–5 mm. long, tapering to the apex, dehiscent through apical pore, epunctate, rigid; ovary ovoid; style slender, 6.5 mm. long; placenta obovoid; ovules 6 or 7, erect, uniseriate.

MEXICO: Chiapas, in deep barrancas near Finca Irlanda, Sept., 1913, *C. A. Purpus 7119* (type, US; isotype, NY).

2. **Yunckeria ovandensis** (Lundell) Lundell, comb. nov.

Ardisia ovandensis Lundell, Contr. Univ. Mich. Herb. 4: 21. 1940.

A small tree, up to 9 meters high, 25 cm. in diameter, the branchlets stout, glabrous; leaves with stout marginate petioles 1–1.3 cm. long; leaf

blades obovate or oblanceolate, 12.5–22 cm. long, 5.5–8.3 cm. wide, apex rounded and obtusely apiculate, base cuneate and decurrent, entire, punctate, subcoriaceous, costa prominent and elevated beneath, the primary lateral veins very slender; inflorescences terminal, 2–3-pinnate, paniculate, up to 12.5 cm. long, glabrous, many-flowered; pedicels slender, up to 1 cm. long at base of corymb, sparsely and minutely papillate at first; flowers in racemiform corymbs, about 1 cm. long at anthesis; calyx lobed to about middle, tapering below into pedicel, minutely and sparsely papillate below in bud; sepals dextrorsely imbricate, broadly rounded, 1.5 mm. long, punctate, the margin scarious, entire, petals oblanceolate-oblong, 8–9 mm. long, 2.5 mm. wide, united about 2 mm. at base, glabrous, dextrorsely imbricate, conspicuously punctate; stamens 8 mm. long; filaments slender, 3–4 mm. long; anthers erect, linear-lanceolate, 4–5.5 mm. long, dorsifixed about 0.75 mm. above base, not punctate, dehiscent through apical pore; ovary small, elongate, ovoid-oblong; style slender, 9 mm. long; placenta obovoid, small; ovules 6 or 7, uniseriate, erect, enclosed.

MEXICO: Chiapas, Mt. Ovando, alt. 1250–2370 m., July, 1938, *Eizi Matuda 2549* (type, MICH; isotypes, F, LL); Pico de Loro, near Escuintla, in advanced forest, June 25, 1941, *Matuda 4281* (F, LL, US), tree, 5 meters high, flowers white.

3. **Yunckeria amplifolia** (Standl.) Lundell, comb. nov.

Ardisia amplifolia Standl., Field Mus. Bot. 4: 249. 1929.

Shrub or small tree up to 5 m. tall, entirely glabrous, branchlets stout; leaves with marginate petioles 1–1.5 cm. long, leaf blades oblong-obovate or obovate, 18–30 cm. long, 8–13 cm. wide, apex obtuse, base cuneate and decurrent, entire, subchartaceous, the lower surface drying paler and reddish-brown, densely punctate but sometimes obscurely so, the costa prominent and elevated beneath, the lateral veins slender; inflorescences bright red, terminal, 2-pinnate, paniculate, 4–15 cm. long, the apical umbels of central axis often subsessile; pedicels slender, up to 1 cm. long, accrescent and up to 1.5 cm. long in fruit; flowers usually 5- rarely 4-parted, subcorymbose-umbellate, the buds up to 1 cm. long, slender, glabrous; sepals dextrorsely imbricate, broadly ovate or elliptic, 2–2.5 mm. long, rounded at apex, entire, rather thick, punctate; petals (in buds) linear-lanceolate, dextrorsely imbricate, about 2.5 mm. wide, united about 1.5 mm. at base, conspicuously punctate; stamens (in buds) 7.5 mm. long; filaments slender, 2 mm. long; anthers erect, dorsifixed about 0.75 mm. above base, linear-lanceolate, 5.5–6 mm. long, attenuate to the apex, dehiscent through apical pore, epunctate; ovary small, ovoid, glabrous; style very slender, up to 9 mm. long, placenta obovoid; ovules 6–8, uniseriate,

erect, enclosed; fruits globose at maturity, about 1 cm. in diameter, black, apiculate; endocarp crustaceous; seed globose, with basal depression extending into center of endosperm; embryo transverse, elongate.

BRITISH HONDURAS: Stann Creek District, Stann Creek Valley, Bocawina Hill, in high ridge, Feb. 12, 1940, *Percy H. Gentle 3215* (LL), small tree, fruits black at maturity.

HONDURAS: Dept. Atlantida, Lancetilla Valley, near Tela, wet forest, alt. 20–600 m., Dec. 6, 1927–Mar. 20, 1928, *Paul C. Standley 52961* (F, US), shrub 6 ft., fruit bright red turning black, rachis red, "*uva de monte*"; vicinity of Tela, at sea level, wet thicket, *Standley 54781* (F, US), shrub or tree 8–15 ft., fruit and pedicels bright cherry-red, fruit edible, "*uva de montaña*"; near Tela, wet thicket, *Standley 55513* (F, US), shrub 8–10 ft. with few branches, panicle bright red, fruit black at maturity; near Tela, *Standley 55659* (A, F, US), shrub 8 ft., fruit red; Lancetilla, by river, June 22–July 27, 1929, *A. M. Chickering 226* (F), small tree; on riverbank above Lancetilla, alt. 100 ft., July 17, 1934, *T. G. Yuncker 4626* (F), tree 15 ft. high, stem 2 in. thick; in forest along the Danto River, slopes of Mt. Congrejal, alt. 500 ft., July 16, 1938, *T. G. Yuncker, J. M. Koepper & K. A. Wagner 8514* (F, US), shrub, about 10 ft. tall, fruit red.

NICARAGUA: region of Braggman's Bluff, 1928, *F. C. Englesing 230* (type, F).

The large reddish-brown leaves are distinctive.

A VARIETY OF JACQUINIA AURANTIACA FROM PETEN

Cyrus Longworth Lundell

Jacquinia aurantiaca Ait. var. **albiflora** (Lundell) Lundell, comb. nov.

Jacquinia albiflora Lundell, Wrightia 2: 60. 1960.

Dr. Louis Williams in the treatment of the Theophrastaceae for the *Flora of Guatemala* interprets *J. aurantiaca* in the broad sense, and recognizes the white-flowered *J. albiflora* as a variety. Pending the revision of the genus *Jacquinia*, I am making the reduction to varietal status.

NOTES ON THE MYRTACEAE OF GUATEMALA

Cyrus Longworth Lundell

Calyptranthes Lindeniana Berg var. **americana** (McVaugh) Lundell, comb. nov.

Calyptranthes Chytraculia (L.) Sw. var. *americana* McVaugh, Fieldiana, Bot. 29: 404. 1963.

On the basis of field studies in 1964 in Guatemala, and the abundant new collections at hand, a preferable treatment over that of Dr. Rogers McVaugh (l.c.) is to recognize *C. Lindeniana* as the continental species, and his var. *americana* as representative of the large-leaved populations of this species. The var. *americana*, which is common in the Rio Pasion basin of Peten, often approaches typical *C. Lindeniana* in leaf form.

The relationship of *C. Lindeniana* and its var. *americana* to *C. Chytraculia* of the West Indies appears to be close, but the continental populations differ significantly in leaf size and form, and to a lesser degree in flower size and pubescence.

EUGENIA FLAVIDA Lundell, Wrightia 3: 14. 1961.

As described originally, the calyx lobes of *E. flavida* are ovate-rounded, 1–1.5 mm. long. On the dried fruits, the disk is up to 3 mm. wide, the calyx lobes 1.5–2.7 mm. wide at base. Some of the dried out brittle fruits, all now preserved loose in packets, were still attached when the specimens were received. The raceme axis is 2–4 mm. long. The leaves at first are pubescent on undersurface with short closely appressed white dibrachiate hairs, while even the youngest leaves of *E. flavoviridis* Lundell are glabrous beneath. The species, known from the type and the isotypes in the Lundell Herbarium and a second collection from Lake Peten Itza (*Lundell 17261*), is not to be confused with *E. flavoviridis* Lundell. The latter has much smaller flowers with a disk about 1 mm. wide, and the larger calyx lobes 0.5–0.6 mm. long, 0.7–1 mm. wide. Dr. Rogers McVaugh (Fieldiana, Bot. 29: 467. 1963 and 24: 343. 1963) included *E. flavida* as a synonym of *E. flavoviridis*, a disposition of the species with which I can not agree.

In *Lundell 17261*, which has only immature fruits, the pedicels are up to 4 mm. long. The inflorescence and fruits, as well as the lower surface of terminal leaves, have traces of appressed pubescence consisting of short white dibrachiate hairs. The calyx and disk are the same as those of the type fruits of *E. flavida*.

Eugenia Kellermanii Lundell, sp. nov.

Frutex vel arbor parva, ramulis puberulis, racemis abbreviatis puberulis; folia parva, petiolis usque ad 1.2 mm. longis stipitata; lamina lanceolato-elliptica, 1.6–4 cm. longa, 0.7–1.5 cm. lata, obtuse subacuminata, basi acuta, chartacea, nervo medio supra puberulo, convexo; racemi perbreves, floribus subsessilibus, bracteolis distinctis, hypanthio glabro infundibuliforme; calycis lobi ovati, majores 0.75 mm. longi; discus floris ca. 0.75 mm. latus; stylus usque ad 3 mm. longus; ovarium biloculare, ovulis quoque loculo 2.

GUATEMALA: Dept. Escuintla, Santa Lucia, alt. 318 m., March 3, 1905, *W. A. Kellerman 5271* (type, LL).

E. Kellermanii is a member of the small-flowered group with close affinity to *E. Capuli* (Schlecht. & Cham.) Berg, as evidenced by the midvein which is convex and puberulent above. The sharply abbreviated one- or two-flowered axillary inflorescences, the subsessile flowers with the pedicel shorter than the hypanthium, and the small subsessile leaves of *E. Kellermanii* well-mark the species, and amply distinguish it from *E. Capuli*.

Eugenia ursina Lundell, sp. nov.

Arbor parva, setosa; folia petiolis 2–3.5 mm. longis stipitata; lamina lanceolata, 6.5–13.5 cm. longa, 2.5–4.7 cm. lata, apice attenuato-acuminata, basi rotundata, integra, chartacea, setosa; racemi abbreviati, usque ad 5 mm. longi; pedicelli fructiferi crassi, usque ad 6 mm. longi; bracteolae distinctae lineari-lanceolatae, usque ad 6 mm. longae, setosae; calycis lobi ovato-lanceolati, acuminati, intus glabri, usque ad 4.5 mm. longi, 2.5 mm. lati; discus 3.5 mm. latus; fructus globosi, diametro 2–3 cm.

GUATEMALA: Alta Verapaz, Chapultepec Farm, 62 km. of Coban, in low forest on top of hill, May 21, 1964, *Elias Contreras 4757* (type, LL), tree, 6 in. diam., 60 ft. high, fruit yellowish.

Strikingly setose like *E. chinajensis* Standl. & Steyerm., *E. ursina* does not otherwise resemble that small-fruited species of the same region. The *Myrcia*-like leaves, linear-lanceolate bracts and bracteoles, long acuminate calyx lobes, and large setose fruits are distinctive features. Its relationship is doubtful.

VOLUME 3 APRIL, 1965 NUMBER 7

WRIGHTIA

A BOTANICAL JOURNAL

CONTENTS

Studies of Tropical American Plants—II.
By Cyrus Longworth Lundell..... 117

Some Additions and Corrections to the Flora of Texas.
By Donovan S. Correll..... 126

The Genus Scleria in the Yucatan Peninsula.
By Earl L. Core..... 141

E 10

PUBLISHED BY
TEXAS RESEARCH FOUNDATION
RENNER, TEXAS

MISSOURI BOTANICAL
JUN 3 - 1965
GARDEN LIBRARY

WRIGHTIA

WRIGHTIA, a botanical journal, is a publication of Texas Research Foundation. The contributions are by staff members and collaborators.

Each volume will contain a series of numbers, to be issued at irregular intervals. The subscription price for Volume 3 is $12.00, postpaid.

VOLUME 3, NUMBER 7
ISSUED APRIL 30, 1965

Printed in the U.S.A.
Cayuga Press, Inc.
Ithaca, New York

WRIGHTIA

VOLUME 3 APRIL, 1965 NUMBER 7

STUDIES OF TROPICAL AMERICAN PLANTS—II

CYRUS LONGWORTH LUNDELL

As an example of the inadequacy of plant exploration in tropical America, the account of the Tiliaceae in the *Flora of Guatemala* lists only one species of *Mortoniodendron*, the endemic *M. guatemalense* Standl. & Steyerm. (Fieldiana, Bot. 24: 315. 1949). In 1962 Elias Contreras found two additional species in the Lacandon area of Peten, and in 1964 I discovered a fourth species in the lower Rio Pasion basin of the same department. All are important forest trees.

Since Dr. Richard A. Howard published his synopsis of the genus *Coccoloba* in Mexico and Central America (Journ. Arn. Arb. 11: 176–220. 1959), four new species have been described from the area encompassed by the *Flora of Guatemala*.

Each collection of significance from Mexico and Central America adds species unreported or undescribed. There is need for increased taxonomic effort on a much broader scale than ever attempted before, coupled with intensive field work. Floristic works are difficult to justify with our very limited knowledge of the flora.

In 1964 field work in Guatemala was centered in Peten, Alta Verapaz and Quiche. My own collections were made at Tikal and in the Rio Pasion basin from the ruins of Ceibal to the river's mouth at Altar de Sacrificios, with Sayaxche and Laguna Petexbatun the focal points. A two day excursion into Chiapas was made along Rio Salinas and up Rio Lacantun for several kilometers. Elias Contreras worked at Uaxactun in Peten, around Sebol in Alta Verapaz, and at Nebaj in Quiche, with some specimens taken at various points along the Coban Road. Dr. George R. Proctor, on a field trip sponsored jointly by Texas Research Foundation and the Institute of Jamaica, concentrated his efforts in the vicinity of Nebaj from June 25 through August 17, where he made 630 collections.

Coccoloba petenensis Lundell, sp. nov.—Arbor, 7 m., ramulis crassis, striatis, puberulentibus; ocreis chartaceis, usque ad 1.2 cm. longis, dense hirtellis et strigosis, glabratis; petiolis ad basem ocreis gerentibus, crassis, dense rufo-puberulentibus, supra canaliculatis, 0.8–1.5 cm. longis; laminis

obovatis vel late elliptico-obovatis, 9–18 cm. longis, 5–10.5 cm. latis, apice rotundatis et late apiculatis, basi rotundatis et subcordatis, coriaceis, basi puberulentibus, nerviis primariis 8–11, adscendentibus; inflorescentiis terminalibus, racemosis, 12.5–35 cm. longis, rachis puberulentibus, crassis, striatis; bracteis 0.5–1 mm. longis, ocreolis membranaceis, bracteis aequaliter; pedicellis fructiferis usque ad 3 mm. longis, crassis, glabris; fructu ovoideo ca. 9 mm. longo, basi substipitato, ad apicem obtuse coronato; acheniis castaneis.

GUATEMALA: Dept. Peten, Rio Petexbatun, between Sayaxche and Laguna Petexbatun, along riverbank, Feb. 4, 1964, *C. L. Lundell 17669* (LL, type), tree, 4 in. diam., 22 ft. high, ripe fruits globose and black, about 8 mm. in diam., in compact cylindrical racemes, sour to taste.

The close affinity of *C. petenensis* to *C. barbadensis* Jacq. is obvious. The species may be distinguished on the basis of its racemose inflorescences with sturdy pedicels up to 3 mm. long, and by the substipitate fruits which are narrowed rather than rounded at base, and obtuse apically. Also, the leaves are somewhat more coriaceous than those of *C. barbadensis*, and the margins are revolute.

Howard (Journ. Arn. Arb. 40: 190. 1959) assigned *Steyermark 44899*, *46040*, *46160* and *46224*, all immature or sterile collections of *C. petenensis* from Peten and Alta Verapaz, to *C. barbadensis* with the statement: "probably represent a hybrid complex." A series of collections of *C. petenensis* was obtained in 1964 in the Rio Pasion basin where the tree is common along rivers and around lagoons. I consider it a distinct taxon.

Coccoloba tenuis Lundell, sp. nov.—Arbor, 13 m., ramulis glabris; ocreis chartaceis, usque ad 1.2 cm. longis, glabratis; petiolis supra basem ocrearum gerentibus, 1.2–2.5 cm. longis, glabris, supra canaliculatis; laminis ovato-lanceolatis vel lanceolatis, 12–22 cm. longis, 5–10 cm. latis, apice acuminatis, basi rotundatis vel subcordatis, subcoriaceis, subtus ad nervos primarios barbatis, nerviis primariis 6–9, arcuato-adscendentibus; inflorescentiis terminalibus, spicatis, 20 50 cm. longis, rachis puberulis, bracteis triangularibus, usque ad 1.3 mm. longis, puberulis, ocreolis puberulis, bracteis aequaliter; floribus ignotus; pedicellis fructiferis subnullis, usque ad 0.5 mm. longis, glabris; fructu ovoideo, 8–10 mm. longo, ad apicem obtuse coronato.

GUATEMALA: Dept. Peten, Dolores, in *bajo* west of Machaquila Road, between km. 85/86, September 21, 1961, ***Elias Contreras 2940*** (LL, type), tree, 8 in. diam., 40 ft. high, "*ura*."

C. tenuis has extraordinarily long, slender, spicate inflorescences, some of which are nearly two feet in length. The subsessile flowers are solitary

and uniformly distributed along the puberulent rachis. The bracts and ocreolae, up to 1.2 mm. long and puberulent, are fully twice as long as the fruiting pedicels. The large leaves, usually subcordate and rounded at base, are barbate in the axils of the primary veins beneath, and there are also scattered hairs along the midvein. The ocreae, glabrate early, are hirtellous and appressed-hirsute apically. Although the fruits are immature, they are distinctly coronate, and the seeds are well developed.

Except for the distinctive elongate spicate inflorescences, *C. tenuis* is quite similar to *C. escuintlensis* Lundell. The leaves of the two species are almost identical except for the crispate pubescence along the midvein of *C. tenuis*. The long pedicels are the notable feature of *C. escuintlensis*.

In his treatment of *C. montana* Standl., Howard (Journ. Arn. Arb. 40: 206. 1959) referred to this species various collections with glabrous leaves and others with pubescence beneath as in *C. tenuis*. Leaves of *C. montana*, *C. escuintlensis*, *C. Steyermarkii* Standl. and *C. tenuis* are scarcely distinguishable. On the basis of leaf characters, Howard placed *C. escuintlensis* and *C. Steyermarkii* in synonymy under *C. montana*, along with *C. Schippii* Lundell.

Described from a sterile fast-growing shoot, the identity of *C. montana* will remain in doubt. No useful purpose is served by arbitrary application of the name. Several species are represented by the leaf type of *C. montana*.

C. Schippii, known from immature material, has very short spikes with sessile flower buds. Its rachis is puberulent and the bracts and ocreolae are similar to those in *C. tenuis*. But the small thin glabrous sharply acuminate leaves, which dry black, are quite distinct from those of *C. tenuis*.

Coccoloba viridis Lundell, sp. nov.—Frutex, 5 m.; ramulis teretibus, striatis, glabris; ocreis chartaceis, hirtellis vel glabratis, usque ad 1.5 cm. longis; petiolis supra basem ocrearum gerentibus, 8–18 mm. longis, glabris; laminis late ellipticis vel obovatis, 7.5–16.5 cm. longis, 4–9 cm. latis, apice breviter acuminatis, basi rotundatis vel anguste rotundatis, membranaceis, viridis, subtus in axillis barbatis, nerviis primariis 8 vel 9, adscendentibus; inflorescentiis terminalibus, racemosis, usque ad 12 cm. longis, rachis glabris, bracteis triangularibus, usque ad 2 mm. longis, ciliatis, glabris, acuminatis, ocreolis membranaceis, glabris, ciliatis ad marginem, usque ad 3 mm. longis; floribus ignotis; pedicellis fructiferis 3–3.75 mm. longis, glabris; fructu ovato; acheniis castaneis, nitidis.

GUATEMALA: Dept. Peten, Rio Pasion, below Sayaxche, along riverbank, Mar. 11, 1964, *C. L. Lundell 18165* (LL, type), shrub, 3 in. diameter, 15 ft. high, *"uva."*

Referable to the section *Campderia*, *C. viridis* is closely allied to *C. Lehmannii* Lindau, which ranges from Costa Rica south into northern

South America. It is distinct from that species in having leaf blades barbate beneath in the axils but glabrous otherwise, and in its glabrous petioles and pedicels. The bracts are ciliate but glabrous otherwise. The distinctive very thin dark green leaves are usually narrowed and rounded at base, and bear a few hairs above at the apex of the petiole along the grooved edges. Only immature fruits are available, but these have perianth lobes free nearly to the base. In leaf venation, *C. viridis* is similar to *C. changuinolana* Standl., which Howard (Journ. Arn. Arb. 40: 200. 1959) includes in the synonymy of *C. Lehmannii*.

The shrub grows at the water edge, and forms conspicuous stands along the Rio Pasion from Sayaxche to its mouth at Altar de Sacrificios. Among the species in the Yucatan Peninsula, *C. viridis* is unique in having thin dark green leaves, the foliage of all other taxa of the genus are pallid, usually drying brownish or blackish.

Bauhinia Gentlei Lundell, sp. nov.—Frutex scandens, ramulis gracilibus juventate brunneo-tomentosis, mox glabratis; stipulae parvae; folia petiolis usque ad 2.5 cm. longis stipitata; lamina late ovata, 5–9 cm. long, 3–8.5 cm. lata, apice bilobata, lobis obtusis, usque ad 3 cm. longis, basi cordata, chartacea, sericea, subtus in venis piloso-tomentosis, venis 7; inflorescentia terminalis, bipinnatim vel tripinnatim paniculata, usque ad 22.5 cm. longa, 32 cm. lata, brunneo-tomentosa; flores subspicati, subsessiles vel breviter pedicellati; calyce 4–5 mm. longo (lobo et hypanthio incluso), dense adpresse sericeo; petala 5, usque ad 7 mm. longa; stamina libera; filamenta glabra, usque ad 6 mm. longa; antherae elliptico-oblongae, 2 mm. longae; ovarium strigosum.

BRITISH HONDURAS: Toledo District, between Condemn Branch Pine Ridge and Moffredye Lagoon, in cohune ridge, Sept. 15, 1946, *Percy H. Gentle 6047* (LL, type), woody vine, white flowers.

Referable to *Schnella*, the species is remarkable for its small flowers. The leafy terminal panicles have long very slender branches up to 15 cm. in length with flowers subsessile and rather remote. The pubescence is golden-brown and very fine.

MORTONIODENDRON PALACIOSII Miranda, An. Inst. Biol. Mex. 28: 322. 1956.

GUATEMALA: Dept. Peten, Lacandon, in *bajo*, about 1.5 km. south, Mar. 6, 1962, *Elias Contreras 3474* (LL), tree, 6 in. diam., 40 ft. high.

Although I have not seen the types of *M. Palaciosii* and *M. Ruizii*, the Peten collections, both in fruit, agree closely with Miranda's descriptions

and illustrations of the species. Described from Chiapas, the two have not been recorded previously from Guatemala.

MORTONIODENDRON RUIZII Miranda, An. Inst. Biol. Mex. 28: 326. 1956.

GUATEMALA: Dept. Peten, Lacandon, on El Caribal trail, about 3 km. sw., in high forest, Feb. 16, 1962, *Elias Contreras 3396* (LL), tree, 8 in. diam., 40 ft. high.

Mortoniodendron vestitum Lundell, sp. nov.—Arbor magna, usque ad 25 m. alta, ramuli graciles, stellato-hirsuti; folia petiolis 3–5 mm., raro usque ad 7 mm., longis stipitata; lamina oblongo-elliptica vel ovato-elliptica, 8–15 cm. longa, 4–8 cm. lata, apice subabrupte et breviter acuminata vel acuminata, basi inaequalis, rotundata vel truncata, membranacea, supra glabrata, subtus stellato-pilosa, nervis lateralibus 5–7-jugis; inflorescentia terminalis, paniculata, usque ad 6 cm. longa, ramulis minute stellato-pubescentibus; capsula subglobosa, loculicide 3–4-valvis, usque ad 2.5 cm. longa, 2.3 cm. lata, dense fulvo-tomentella.

GUATEMALA: Dept. Peten, Rio Pasion, Laguna San Juan de Acul, in high forest on rocky slopes above lake, Feb. 11, 1964, *C. L. Lundell 17947* (LL, type), tree, 6 in. diam., 40 ft. high.

From all other species of the genus, *M. vestitum* may be recognized by the persistent soft stellate pubescence of the lower leaf surface. The upper surface at maturity is pubescent only along the midvein and primary nerves. It appears to be related to *M. Ruizii* Miranda which has essentially glabrous leaves and much larger fruits with thick valves.

Quararibea parviflora Lundell, sp. nov.—Arbor parva, ramuli graciles, minute stellato-tomentelli; folia petiolis 7–12 mm. longis stipitata; lamina membranacea, oblonga vel oblongo-oblanceolata, 9–20 cm. longa, 3.5–6.5 cm. lata, apice acuminata, basi rotundata, novella minute stellato-lepidota, in axillis nervorum subtus barbata, glabrata; flores solitarii, oppositifolii, vel plures (2–3) in ramulis floriferis, pedicello 3–5 mm. longo, supra bracteolato; calyx in anthesi turbinatus, 1 cm. longus, 3–5-lobus, extus lepidis stellatis parvis griseus, intus pilis adpressis sericeus; petala 1.5 cm. longa, minute tomentella; tubus stamineus cylindricus, petalis aequilongus, minute tomentosus, apice brevissime 5-lobatus, lobis rotundatis; stylus filiformis tubo aequilongus, stigmate capitato, ca. 2 mm. diam.; ovarium inferum, biloculare, ovulis 2 pro loco.

GUATEMALA: Dept. Peten, Lacandon, in high forest, March 13, 1962, *Elias Contreras 3520* (LL, type), small tree, 3 in. diam., 20 ft. high, flowers white, aromatic.

The relationship of *Q. parviflora* to *Q. turbinata* (Sw.) Poir. is very close. The Peten tree has oblongish rather than elliptic or obovate leaves, stigma twice as large, and staminal tube with rounded lobes at apex. Of significance is the presence on the pedicels of bractlets at or near the base of the calyx. In West Indian specimens of *Q. turbinata* the bractlets are at the base of the pedicel. The staminal tube is tomentose in *Q. parviflora,* while the pubescence is scarcely discernible in *Q. turbinata.*

I have not seen material of *Q. verticillaris* (DC.) Vischer, but this species of Mexico was described by De Candolle (Prodr. 1: 447. 1824) as having leaves acuminate at apex and base. The leaves of *Q. parviflora* are rounded or inconspicuously emarginate at base, similar to those described for *Myrodia angustifolia* Mart. of Brazil.

Casearia Hintonii Lundell, sp. nov.—Arbor parva; ramuli graciles, novelli parce hirtelli; folia petiolis 2.5–4 mm., raro usque ad 7 mm., longis stipitata; lamina anguste elliptico-oblonga vel anguste oblonga, 8–20 cm. longa, 3.5–6 cm. lata, apice acuminata vel acuta, basi acuta, membranacea, glabra, obscure arguta; flores fasciculati; pedicelli 6–12 mm. longi, dense puberuli; sepala 5, anguste oblonga, 5.5–9 mm. longa, 1.5–2.3 mm. lata, libera, minute tomentella; stamina 9 vel 10, usque ad 5 mm. longa; filamenta glabra, basi connata; antherae oblongae, 1–1.2 mm. longae, dorso area punctata praeditae; staminodia pilosa; ovarium glabrum; stylum basi dense pilosum.

MEXICO: Michoacan, Distr. Coalcoman, Aquila, woods, Aug. 7, 1941, *Geo. B. Hinton 15964* (LL, type), tree, 4 m.; same locality, alt. 250 m., shady barranca, Mar. 24, 1941, *Hinton 15834* (LL), shrub, 3 m., flower white.

Related to *C. Bartlettii* Lundell, *C. Hintonii* differs at once in its short petiolate, linear-oblong serrulate leaves, free sepals, and filaments connate only at base. In *C. Bartlettii* the leaves are conspicuously black-punctate, while in *C. Hintonii* they are inconspicuously pellucid-punctate.

Eugenia Cantuana Lundell, nom. nov. *Eugenia Mirandae* Cantu, An. Inst. Biol. Mex. 14: 487. 1944, not *E. Mirandae* Merrill, 1915.

MEXICO: Morelos, Sierra de Topoxtlan, alt. 7500 ft., May 10, 1900, *C. G. Pringle 8333* (LL), 15–25 ft.

Pringle 8333 is from the same general locality as the type of *E. Mirandae* Cantu, and my interpretation of the species is based on this collection. *E. Cantuana* is very close to *E. culminicola* McVaugh. Both differ in only minor features from *E. pueblana* Lundell, but I consider that the three are distinct taxa.

EUGENIA CAPULI (Schlecht. & Cham.) Berg var. **Lindeniana** (Berg) Lundell, comb. nov. *Eugenia Lindeniana* Berg, Linnaea 29: 240. 1858.

GUATEMALA: Dept. Peten, Lacandon, about 9 km. west, bordering Rio Usumacinta, Mar. 8, 1962, *Elias Contreras 3480* (LL), shrub, 10 ft. high, fruit green, "*guayabillo.*"

Not collected previously in Guatemala, the shrub was described from Tabasco. From the photograph of the type, *J. Linden 619*, the Contreras collection agrees closely in leaf form. As indicated by McVaugh (Fieldiana, Bot. 24: 338. 1963), the relationship to *E. Capuli* is obvious, but this linear-lanceolate leaved form is worthy of varietal status.

EUGENIA KOEPPERI Standl., Field Mus. Bot. 9: 320. 1940.

GUATEMALA: Dept. Alta Verapaz, Semococh, 16 km. of Sebol, on Coban Road, in high forest on top of hill, May 11, 1964, *Elias Contreras 4686* (LL), tree, 6 in. diam., 40 ft. high, "*guayabillo.*" Dept. Peten, Dolores, south of village, in high forest bordering arroyo, Oct. 28, 1961, *Contreras 3121* (LL), tree, 8 in. diam., 40 ft. high, "*guayabillo*"; Lacandon, in *bajo* about 1.5 km. south, Mar. 6, 1962, *Contreras 3471* (LL), tree, 4 in. diam. 35 ft. high, fruit yellow-green; Rio Salinas, above Rio Pasion, in high open *caoba-corozo* forest above river, Feb. 8, 1964, *C. L. Lundell 17834* (LL), tree, 4 in. diam., 20 ft. high, leaves brownish beneath.

In the *Flora of Guatemala* (Fieldiana, Bot. 24: 352. 1963), Dr. Rogers McVaugh included *E. Koepperi* in the synonymy of *E. octopleura* Krug & Urb. Recent collections from Peten (*Lundell 17834, Contreras 3121, 3471*) are in fruit. These fruits are perfectly smooth, subglobose to obovoid, up to 1.5 cm. in diameter and substipitate. Also, the bracteoles are fleshy and connate forming a cup-like involucre beneath the flower. *E. Koepperi* appears to be distinct from the 8-ribbed *E. Doubledayi* Standl., and most certainly not referable to *E. octopleura.*

EUGENIA LETRERoana Lundell, Wrightia 3: 15. 1961.

GUATEMALA: Dept. Quiche, Nebaj, on rocky hill, about 4 km. west, alt. 6700 ft., June 11, 1964, *Elias Contreras 4943* (LL), *4944* (LL), *4945* (LL), shrub, 2–3 in. diam., 7–9 ft. high, fruit reddish or black, flowers white, "*guayabillo*"; Nebaj, in forest on rocky hill, about 10 km. west, alt. 7900 ft., July 3, 1964, *Contreras 5183* (LL), shrub, 3 in. diam., 12 ft. high, flowers white, "*chispaltze*"; Nebaj, in high forest, about 12 km. west, alt. 8000 ft., July 4, 1964, *Contreras 5203* (LL), shrub, 4 in. diam., 15 ft. high; mountain slopes s. of Nebaj, 7000–7500 ft., in mossy montane rain forest, July 26, 1964, *George R. Proctor 25295* (LL), tree, 8 m. tall.

This distinctive species, known heretofore only from the type collection from Chiapas, appears to be rather common in the Nebaj area of Guate-

mala. Its fruits are unusual, being oblong-ellipsoid and varying in length from 8–20 mm. In the Guatemalan area, the plants are essentially glabrous, and the leaves are caudate-acuminate and obscurely crenulate.

Eugenia minimiflora Lundell, sp. nov.—Arbor parva; ramuli glabri; folia petiolis 4–7 mm. longis stipitata; lamina lanceolata vel lanceolato-elliptica, 4–7.5 cm. longa, 1.5–3.3 cm. lata, apice acuminata, basi acuta, integra, glabra, subcoriacea; inflorescentia axillaris; racemi breves, pedicelli usque ad 1 mm. longi, bracteoli hirsutuli; calycis lobi glabri, ciliati, subaequales, ovati, 0.5–7 mm. lati, 0.4–0.5 mm. longi; discus ca. 1 mm. latus; stylus 5 mm. longus; ovarium biloculare, ovulis quoque loculo 5 vel 6; fructus ignotus.

BRITISH HONDURAS: Stann Creek District, near Carasow Hill, in high ridge, Aug. 18, 1953, *Percy H. Gentle 8003* (LL, type), tree, 4 in. diam., flowers white.

With close affinity to *E. axillaris* (Sw.) Willd., *E. minimiflora* appears to represent a local population differing in its smaller flowers, short crowded racemes, pedicels less than 1 mm. long, and small acuminate leaves with acutish acumen. Possibly its minute, ovate, equal or subequal calyx lobes are its most distinctive feature, for these are scarcely more than half as large as those of the types of *E. cozumelensis* Lundell and *E. guttata* Lundell, which Dr. Rogers McVaugh considers typical of *E. axillaris* (Fieldiana, Bot. 24: 333. 1963).

EUGENIA SAVANNARUM Standl. & Steyerm., Field Mus. Bot. 23: 132. 1944.

GUATEMALA: Dept. Alta Verapaz, Sebol, about 3 km. south on old road to Peten, in high forest, Apr. 18, 1964, *Elias Contreras 4409* (LL), shrub, 2 in. diam., 7 ft. high; Sebol, in high forest about 100 m. sw. of Rio Sebol, Apr. 30, 1964, *Contreras 4557* (LL), tree, 4 in. diam., 20 ft. high, flowers yellow-white; Semococh, 16 km. from Sebol on Coban Road, in high forest on top of hill, May 14, 1964, *Contreras 4674* (LL), tree, 4 in. diam., 10 ft. high.

The species has been known previously only from the type collection.

Plinia peroblata (Lundell) Lundell, comb. nov. *Eugenia peroblata* Lundell, Wrightia 2: 124. 1961.

BRITISH HONDURAS: El Cayo District, hill slope, Gorge Creek section, Humming Bird Highway, Aug. 26, 1955, *Percy H. Gentle 8845* (LL, type; LL, isotype), tree, 2 in. diam.

Dr. Rogers McVaugh concluded that *E. peroblata* represents a distinctive species of *Plinia*, but in the absence of flowers he did not make a formal transfer to that genus (Fieldiana, Bot. 24: 373. 1963).

This is the first record of *Plinia* for the region. Since the collection of additional material is uncertain, the transfer is desirable.

Parathesis acuminata Lundell, sp. nov.—Frutex, ramuli crassiusculi, novelli minute peradpresse tomentelli; folia petiolis 1–2 cm. longis stipitata; lamina oblanceolata vel anguste elliptico-oblonga, 9.5–20 cm. longa, 3–5.5 cm. lata, apice acuminata, basi acuta vel acuminata, chartacea, integra, supra novella papillosa, subtus novella peradpresse tomentella, glabrata; inflorescentia terminalis vel axillaris, paniculata, congesta, minute adpresse tomentella; pedicelli crassi, 2–4 mm. longi, papillosi; flores umbellati, ante anthesin 4–4.5 mm. longi, minute papillosi; sepala parva, anguste triangularia, ca. 1 mm. longa; petala lineari-lanceolata, usque ad 4.5 mm. longa, aurantiaco-lineata; stamina 2.75–3 mm. longa; filamenta nigro-punctata, ca. 2 mm. longa; antherae erectae vel versatiles, ca. 1.5 mm. longae, dorso area nigro-punctata praeditae; ovarium glabrum, apice hirsutum; placenta globosa, apiculata; ovula 11 vel 12, minuta, uniseriata.

EL SALVADOR: Dept. Santa Ana, matorrales y bosque mixto humedo 20 kms. al S. O. de Montecristo, alt. 1500 m. May 23, 1963, *Antonio Molina R. & Albertina R. Molina 12576* (F, type; F, isotype), arbusto 3 m., fls. blancas.

P. acuminata, with anthers which appear to be versatile at anthesis, is perhaps nearest *P. trichogyne* Hemsl., a species with tomentose ovary and black-lineate petals. As in the small-flowered *P. subcoriacea* Lundell, to which *P. acuminata* bears a resemblance, inflorescences are either terminal or axillary.

SOME ADDITIONS AND CORRECTIONS TO THE FLORA OF TEXAS

Donovan S. Correll

The first really serious studies on the flora of Texas were those of A. P. DeCandolle, William Hooker and Asa Gray whose works were based on the collections of J. L. Berlandier, Thomas Drummond, L. C. Ervendberg and F. J. Lindheimer made during the early and middle part of the 19th Century. Since that time many individuals have labored to produce what we know today of the flora of the vast region known as Texas.

The flora of the state, when considered in its entirety, is a political and highly artificial one in that a number of natural floristic elements or regions are encompassed within its boundaries. To name several, are such areas as a typically southeastern United States flora in East Texas, a littoral and Coastal Plain flora along the Gulf Coast, a Great Plains flora in the Texas Panhandle, a Tamaulipas brushland flora in extreme South Texas, and Chihuahua Desert and Rocky Mountain floras in Trans-Pecos Texas, not to mention such areas as the unique Edwards Plateau flora of West-Central Texas. This extreme diverseness makes the flora of Texas not only botanically appealing but also a challenge of the first magnitude.

In 1960, the author proposed a project which he hoped would ultimately result in the production of a Manual of all the vascular plants of Texas under the auspices of Texas Research Foundation. Marshall C. Johnston, of the University of Texas, who was invited to do so, became co-author of the project. With the unstinted encouragement and support of their respective institutions and grant support from National Science Foundation (G-15901; GB-572; GE-3138) they formally initiated the project in 1961. In order to facilitate work on the Manual, the families were divided between the two authors. As in the case of the present paper, each researcher was to publish independently new additions for Texas that might come to light in the families upon which he had agreed to work. To date, the bulk of the work has been largely in the field. However, a rather sizable manuscript has also accrued from herbarium research. The following species have come to light during this research and are either new to Texas or to science. In addition, there are verifications of the occurrence of several other species in the state whose category heretofore has been indecisive. All of the specimens cited, unless otherwise noted, are in the Lundell Herbarium (LL) of Texas Research Foundation.

AZOLLA MEXICANA Presl, Abh. Böhm. Ges. Wiss. V, 3: 150. 1845.

TEXAS: Cameron County, forming large floating mats on canal between Santa Maria and La Paloma, May 4, 1962, *D. S. Correll & E. C. Ogden 25098*. El Paso County, floating on water in canal along Rio Grande, just southeast of Ysleta, April 30, 1962, *D. S. Correll & E. C. Ogden 25046*.

This is the first report of this species from Texas. Dr. H. K. Svenson examined these collections and, although spore-bodies were not evident, he was of the opinion that the plants represented this species. It is frequent in northern Mexico and occurs northward to Utah, British Columbia, Wisconsin and Illinois.

CYSTOPTERIS BULBIFERA (L.) Bernh., Neu. Jour. Bot. Schrad. 1(2): 10. 1801.

TEXAS: Culberson County, South Fork of McKittrick Canyon, Guadalupe Mts., in pocket of ledge, several clumps seen, upper part of canyon near pools and rope swing, June 21, 1964, *D. S. Correll & Craig A. Hanson 29803*.

This is the southernmost station known for this typically northern species. It has previously been known to occur south to Arkansas, Oklahoma, southeastern New Mexico and central Arizona. The finding of this species and *Azolla mexicana* in Texas brings the total of ferns and fern allies now known to occur in the state to 113.

This is one of the three species from McKittrick Canyon reported here as being new to the flora of Texas. They are additional reasons why the Guadalupe Mountains in Texas should be preserved for posterity.

XYRIS ELLIOTTII Chapm., Fl. Southern U. S. 500. 1860.

TEXAS: Henderson County, 4 miles southeast of Athens, pitcher plant bog, flowers yellow, June 6, 1963, *D. S. Correll & D. C. Wasshausen 27496;* same locality, June 30, 1963, *D. S. Correll, E. C. Ogden & H. K. Svenson 28075*.

This species is new to Texas. Small, in his *Manual of the Southeastern Flora* (p. 254. 1933) gives the distribution of this species as from Florida to Mississippi and South Carolina. The linear leaves, about 2 mm. wide, with scabrid margins distinguish this plant in the field.

POLYGONATUM COBRENSE (Woot. & Standl.) Gates, Bull. Torr. Bot. Club 44: 126. 1917.

TEXAS: Culberson County, in humus among boulders in shade, South Fork of McKittrick Canyon, Guadalupe Mts., June 21, 1964, *D. S. Correll & Craig A. Hanson 29817*.

This species, previously known to occur only in western New Mexico and eastern Arizona, is new to Texas. An extensive colony of this species was found in the vicinity of the station for the rare *Physocarpus monogynus* (Torr.) Coult. and a sizable colony of *Celastrus scandens* L. It superficially resembles the relatively common East Texas *Polygonatum biflorum* (Walt.) Ell.

DIOSCOREA QUATERNATA (Walt.) J. F. Gmel., Syst. 581. 1796.

TEXAS: Harrison County, Caddo Lake State Park, rich hardwood forest slope, April 21, 1962, *D. S. Correll 25010*. Jasper County, sandy pine-hardwood hills 4 miles east of Jasper, May 13, 1963, *D. S. Correll 27421*.

This species, new to Texas and an extension from Louisiana, may be superficially distinguished from the only other species found in the state, *D. villosa* L., in having the leaves of one or more of the lower nodes in whorls of 4 to 7.

Ostrya chisosensis Correll, sp. nov.

Arbor, ramis gracilibus coronam cylindricam conformantibus; ramuli graciles, pubescentes, eglandulosi; folia exilia, ovato-elliptica vel elliptica vel elliptico-lanceolata, ad basim oblique rotundata et parve cordata, ad apicem obtusa vel acuta, serrulata, pubescentia, eglandulosa; amenta staminalia cylindrica; squamae staminales late triangulo-ovatae, concavae, ad apicem longo-cuspidatae, marginibus et cuspidibus longo-fimbriatis; amenta pistillata fere 6 fructus componenta.

Tree up to 14 m. high, with the branchlets, leaves and floral parts more or less pubescent but without stipitate glands; branches slender, distantly spaced to form a cylindrical crown, the branchlets and twigs slender and willowy; leaves subsessile or with petioles 1.5–2 mm. long, rather thin, ovate-elliptic to elliptic or elliptic-lanceolate, obliquely rounded and slightly cordate at base, obtuse to acute at apex, dark green on upper surface, paler on lower surface, up to 6 cm. long and 3 cm. wide, sometimes widest above the middle, more or less doubly and finely serrate; staminate aments cylindrical, in clusters of 2 or 3, 3–4 cm. long, about 4 mm. thick at anthesis; staminate scales broadly triangular-ovate, concave, tapered into a long-cuspidate apex, 2.5–3 mm. long, about 2 mm. wide, with the cusp at least 1 mm. long and usually about as long as the body, the margins and cusp long-fimbriate; fruiting aments on stout stems about 1 cm. long, about 2 cm. long, densely hirsute, composed of about 6 fruits; seed tan-color, ellipsoid to ovoid, flattened, about 6 mm. long and 3 mm. wide.

TEXAS: Brewster County, Chisos Mts., Big Bend National Park, base of north-facing ledges, Emory Peak, colony of about 12 trees (2 trees up to 35 ft. tall and 10 inches in diameter), bark blocked below, shredded-scaly above, crown cylindric, branches distant and slender, June 17, 1964, *D. S. Correll 29733* (type, LL; isotypes, US, TEX, GH); high shady crevice in rock bluff, near Nail place, Chisos Mts., August 21, 1915, *Mary S. Young s.n.* (TEX); north of Crown Mt., Chisos Mts., July 1, 1937, *B. H. Warnock 21633* (TEX); rare tree up to 30–40 feet high, igneous soil on Emory-Boot trail, Big Bend National Park, Chisos Mts., alt. 7500 ft., June 8, 1952, *B. H. Warnock 10478:* sparse tree along trail from Boot Spring and Basin, Chisos Mts., north side of Emory Peak, Big Bend National Park, July 15, 1955, *B. H. Warnock 12726.*

This hop-hornbeam, that has previously been included in *O. Baileyi* Rose, a native of the Guadalupe Mountains more than 200 miles to the north, is apparently isolated in the Chisos Mountains in the Big Bend National Park. As far as I know, *Ostrya* has never been collected in Texas outside of these two mountain ranges. *Ostrya Baileyi*, has, in turn, been placed in the Arizona *O. Knowltonii* Cov., a probable dubious reduction in my opinion.

Some of the essential characteristics that separate *O. chisosensis* from *O. Baileyi* are given below in the key. In addition to them, however, it may be noted that the slender, distantly spaced branches of *O. chisosensis* form a cylindrical crown while the stiffish, crowded branches of *O. Baileyi* form a globose, rounded crown. It may also be noted that the staminate scales of *O. chisosensis* are more like those of the East Texas *O. virginiana* (Mill.) K. Koch than like those of *O. Baileyi.*

1. Stipitate glands present (especially on twigs and leaf-petioles); leaf-blades typically ovate, coarsely serrate; staminate aments 2–3 cm. long, the bracts merely short-apiculate and with glandular-ciliate margins; in Guadalupe Mts. of Texas. ..... *O. Baileyi.*

1. Stipitate glands not present; leaf-blades typically elliptic, finely serrate; staminate aments 3 cm. long or more, the bracts with a cusp about as long as the body and with long-fimbriate margins; in Chisos Mts. of Texas..... *O. chisosensis.*

Urtica chamaedryoides Pursh var. **Runyonii** Correll, var. nov.

Haec varietas, in habitum similis, foliis dentibus maioribus et triangulatioribus, inflorescentiis typiciis cylindricis et saepe ramosis a var. *chamaedryoides* differt. In varietate typica inflorescentiae capitatae sunt.

In habit very similar to var. *chamaedryoides* but the leaves have larger, more triangular teeth, and the inflorescences are typically cylindric and often branched instead of being capitate.

TEXAS: Cameron County, "Ortiguilla," Brownsville, waste grounds, April 15, 1959, *Robert Runyon 4731* (type, LL); Palm Grove, south of Brownsville, in forest, April 6, 1941, *C. L. Lundell & Amelia A. Lundell 10008;* Palm Swamp, south of Brownsville, Feb. 6, 1947, *J. F. Brenckle 47–342;* in open palm hammock, Las Palmas, flowers greenish white, April 20, 1959, *D. S. Correll & R. C. Rollins 20953.*

ASIMINA PARVIFLORA (Michx.) Dun., Monog. Anon. 82, *t. 9.* 1817.

In Cory and Parks' *Catalogue of the Flora of Texas* (Texas Agr. Exp. Sta. Bull. 550: 67. 1937) this species was included as occurring in the Timber Belt and Blackland Prairies of East Texas. However, obviously because of an oversight, this species was omitted from Gould's *Texas Plants,* published in 1962. *Asimina parviflora* is rather common in the woodlands of Southeast Texas.

ARMORACIA AQUATICA (Eat.) Wiegand, Rhodora 27: 186. 1925.

TEXAS: Tyler County, in water and mud on west side of Town Bluff Lake, along Route 190, flowers white, May 25, 1960, *D. S. Correll 23461.*

This eastern species, previously known to occur west to Louisiana, is new to Texas. A rather extensive colony was found in water on the edge of Town Bluff Lake, east of Woodville.

DENTARIA LACINIATA Muhl. in Willd., Sp. Pl. 3: 479. 1800.

TEXAS: San Augustine County, 7 miles east of San Augustine, east of Apolo-gacho stream, Cousin's farm, black ankle community, flowers white, March 17, 1962, *D. S. Correll & Helen B. Correll 24831.*

This predominantly eastern species, previously known to occur west to Oklahoma and Louisiana, is new to Texas. A small colony was found on a rocky moist wooded slope in company with the rare species, *Cypripedium Calceolus* var. *pubescens* (Willd.) Correll and *Thelypteris Phegopteris* (L.) Slosson.

Dr. Reed C. Rollins, who is preparing the family Cruciferae for Lundell's *Flora of Texas,* has checked the above two cruciferous species.

FENDLERA LINEARIS Rehd., Jour. Arn. Arb. 1: 205. 1920.

TEXAS: Brewster County, southwest slope near summit of Nugent Mt., Chisos Mts., Big Bend National Park, June 16, 1964, *D. S. Correll, H. S. Gentry & Craig A. Hanson 29729.*

This northern Mexican shrub is apparently new to not only Texas but also to the United States. A number of plants in fruit were found at the Texas locality.

PARNASSIA ASARIFOLIA Vent., Jard. Malm. *pl. 39*. 1803.

TEXAS: Nacogdoches County, 9 miles west of Garrison, evergreen shrub bog on FM road 1087 (to Henderson–Nacogdoches Hy.), April 8, 1964 (in fruit), *D. S. Correll & Helen B. Correll 29069*.

Fortunately, this open-wooded bog, with characteristics somewhat similar to the "pocosin" of the Carolinas and the "evergreen shrub bog" of southeastern United States, wherein ericaceous plants, viburnums, hollies and other such plants predominate, has been left relatively undisturbed — an extremely rare instance in most of East Texas. No signs of the rootings of hogs and armadillos and the trampling of horses and cattle were evident. It is a nicely preserved bog. Scattered over the floor of this bog on mats of sphagnum-moss are large colonies of *P. asarifolia*. This typically eastern species was previously known to occur only as far west as Alabama.

Polygala maravillasensis Correll, sp. nov.

Plantae scopariae, glabrae et glauco-caeruleae; caules basibus caudeis, erectae vel erecto-ascendentes, robustae et rigidae; folia squamelliforma, linearo-subulata, mature decidua; racemi multi-flori, recti, simplices vel ramosi; flores punicei vel rosei; sepala elliptica, obtusa; sepalum superum persistens; alae obovatae, apicibus rotundatae; petala supera ligulata, fusca rosea; capsula cuneata vel cuneato-obovata, glabra.

Plants broomlike, 2–4 dm. tall; stems from a woody base, erect or erect-ascending, rather stout and stiff, glabrous and usually glaucous-bluish; leaves squamiform, linear-subulate, mostly less than 1.5 mm. long, marginally incurved-puberulous, early-fugacious; racemes many-flowered, straight, simple or branched, up to 10 cm. long; flowers pink and rose-color, with pedicels 1.5–2.5 mm. long; sepals 2–2.5 mm. long, elliptic, obtuse, the upper persistent; wings obovate, rounded at apex, about 4.5 mm. long and 2 mm. wide; the 2 upper ligulate petals deep rose-color; keel 3.5–4 mm. long (including the beak); capsule cuneate to cuneate-obovate, glabrous, 3–4 mm. long; seeds sericeous, 2 mm. long; aril 1 mm. long, with 2 short lateral lobes.

TEXAS: Brewster County, in crevices of ledges on summit of mountains west of Maravillas Creek, about 2 miles from mouth of Maravillas Canyon, plants glaucous-bluish, flowers pink and rose-color, June 24, 1964, *D. S. Correll & Craig A. Hanson 29877* (type, LL; isotypes, US, TEX, GH).

This species is most nearly allied to *P. minutifolia* Rose, a species that I understand was recently found for the first time in Texas by Dr. Barton H. Warnock on the Overton Road in Brewster County. It differs from that species, however, in being a larger glaucous plant, 2–4 dm. tall, with

many-flowered simple or multiple racemes up to 10 cm. long. The flowers are pink and rose-color and the cuneate to cuneate-obovate capsules 3–4 mm. long. *Polygala minutifolia* is a small green plant about 1.5 dm. tall, with 4- to 6-flowered racemes that are 2.8 cm. long or less. The flowers are white and the oblong capsules 2.8 mm. long.

ILEX GLABRA (L.) A. Gray, Man., ed. 2, 264. 1856.

TEXAS: Harrison County, Caddo Lake Area, near Caddo Lake State Park, May 1959, *G. Edwin, D. S. Correll & I. M. Johnston 657, 658, 659.*

Lundell included this species in his *Flora of Texas* (Vol. 3: 113. 1943), but he had not seen a specimen from the state. He, however, correctly assumed that it should occur in the eastern Timber Belt. Earlier, in 1937, Cory and Parks, in their *Catalogue of the Flora of Texas*, p. 67., had reported the species from Texas based, apparently, on incorrectly identified material.

ILEX MONTANA Torr. & Gray in A. Gray, Man. 276. 1848.

TEXAS: Hardin County, one mile south of Saratoga, mixed forest, shrub to 8 ft. tall, berries dark red, November 14, 1963, *D. S. Correll & Lance Rosier 28672.* Jasper County, rolling hills in mixed forest 7 miles south of Jasper on Kirbyville Hwy., tall shrub to 7 ft., fruit globose, dark red, on short pedicels, November 14, 1963, *D. S. Correll 28656.*

This eastern species is new to Texas. It had been thought previously to occur only as far west as Tennessee and Alabama.

ILEX VERTICILLATA (L.) A. Gray, Man., ed. 2, 264. 1856.

TEXAS: Orange County, in swamps at west end of the Sabine River bridge, route 90, small slender tree to 10 ft. tall, May 24, 1959, *D. S. Correll, I. M. Johnston & G. Edwin 22310A:* same locality, berries red, subglobose, November 10, 1962, *D. S. Correll 26782.*

This typically eastern species had previously been known to occur only as far southwest as Missouri, Tennessee and Georgia.

Dr. Gabriel Edwin, monographer of *Ilex*, has examined all of the specimens cited here.

Aesculus pavia L. var. **flavescens** (Sarg.) Correll, comb. nov.

Aesculus discolor Pursh var. *flavescens* Sarg., Trees & Shrubs 2: 267. 1913.

This yellow-flowered plant is the representative of this species throughout most of the Edwards Plateau in central Texas. It has been found as

far west as Edwards and Kinney counties. Although flower-color, in itself, is usually not sufficient reason for the segregation of a plant, the apparent geographic separation of the yellow-flowered plant from the red-flowered typical *A. pavia* would seem to justify this distinction. I have not seen the yellow-flowered plant in Texas other than on the Edwards Plateau. On the eastern edge of the Plateau, especially in Hays, Kendall, Comal and Bexar counties, where typical *A. pavia* and var. *flavescens* come together, plants are frequently found that have yellow flowers that are deeply tinged or marked with red.

CARDIOSPERMUM DISSECTUM (S. Wats.) Radlk., Mon. Gen. Serj. Suppl. 136, 162. 1886.

TEXAS: Starr County, 1¼ miles northwest of Roma, November 9, 1940, *V. L. Cory 35882* (SMU); growing partially supported by itself and other plants in a small colony in gravelly soil 3 miles north of Roma, July 15, 1957, *D. S. Correll & I. M. Johnston 18075*.

As far as I know, this is the first time this species has been reported from the United States. It had heretofore been known only from the environs of Ciudad Chihuahua, Mexico. The plant is easily distinguished from the relatively common *C. halicacabum* L. by its finely dissected leaves with segments rarely as much as 4 mm. wide.

Mr. Robert Runyon, of Brownsville, has recently informed me that he has also collected this species in Starr County as well as in Hidalgo County where he found it to occur infrequently.

SERJANIA INCISA Torr., U. S. & Mex. Bound. Bot. 47. 1859.

TEXAS: Kleberg County, Kingsville, summer 1940, *J. F. Sinclair 42–25*.

In 1891, Coulter included this species as "Along the lower Rio Grande" in his *Botany of Western Texas* (Contrib. U. S. Nat. Herb. 2: 65). Cory and Parks subsequently included the species in their *Catalogue of the Flora of Texas*, p. 68. However, apparently through an oversight, the species was omitted from Gould's *Texas Plants* (1962). The specimen cited here is the only one I have seen from Texas.

IMPATIENS CAPENSIS Meerb., Afbeel. Gew., *t. 10*. 1775.

In 1938, Cory and Parks included this species, as *I. biflora* Walt., from Texas in their *Catalogue of the Flora of Texas*, p. 68. Apparently through an oversight, Gould, in his *Texas Plants* (1962), omitted the family Balsaminaceae. The following are the only specimens of this species I have seen from Texas.

TEXAS: Fannin County, seepage slope along the Bois d' Arc River near Monkstown, plants large and coarse, flowers orange, July 12, 1946, *D. S. Correll 13136*. Red River County, 5 miles southeast of Kiomatia, floodplain woods along stream, May 18, 1963, *D. S. Correll & Helen B. Correll 27442*. San Augustine County, about 6.5 miles northwest of Denning, seepage in open places, April 20, 1962, *D. S. Correll 24991*; same locality, May 9, 1962, *D. S. Correll & E. C. Ogden 25178*.

PEPLIS DIANDRA Nutt. ex DC., Prodr. 3: 77. 1828.

TEXAS: Bowie County, attached and floating in Club Lake, about 3 miles west of New Boston, May 12, 1962, *D. S. Correll & E. C. Ogden 25253*.

In 1937, Cory and Parks included this species under the name *Didiplis diandra* (Nutt.) Wood in their *Catalogue of the Flora of Texas*, p. 75. In Gould's *Texas Plants* (1962) this species was omitted, apparently through an oversight. The specimen cited here is the only one I have seen from Texas.

MONOTROPA HYPOPITHYS L., Sp. Pl. 387. 1753.

TEXAS: Lamar County, 1½ miles east of Direct, in humus of woods, along stream, entire plant cream-yellow, May 19, 1963, *D. S. Correll & Helen B. Correll 27488*.

In 1892, Coulter included both *Monotropa Hypopithys* and *M. uniflora* in his *Botany of Western Texas* (p. 254) without designating any specific locality for either. In 1938, Cory and Parks excluded the genus *Monotropa* from their *Catalogue of the Flora of Texas*, but they included for West Texas the apparently erroneous name "*Hypopitys sanguinea* Heller," probably in reference to *M. latisquama*. Gould, in his *Texas Plants* (1962), excludes entirely the genus *Monotropa*. The specimen of *M. Hypopithys*, cited above, is the only definite collection I know of for Texas. In addition, the other two species comprising this genus are found in Texas, as represented by the following collections.

MONOTROPA LATISQUAMA (Rydb.) Hult., Fl. Alaska and Yukon VIII: 1216. 1948.

TEXAS: Culberson County, left fork of Smith Canyon, interior limestone canyon of Guadalupe Mts., above Frijole, rich slopes under pines, one plant only, the whole plant bright cherry-red, July 17, 1945, *Rogers McVaugh 7430* (SMU); The Bowl, Guadalupe Mts., 3 miles north of Pine Springs, August 29, 1950, *Winnifred V. Fischer s. n.* (SMU).

MONOTROPA UNIFLORA L., Sp. Pl. 387. 1753.

TEXAS: Hardin County, 6 miles south of Silsbee, frequent in moist woods at Pine Knot, stem scapose, up to 2 dm. high, (no date), *V. L. Cory s. n.* (SMU). Newton

County, Wood's Park, eastern Newton, flowers pearly white, changing to light pinkish scarlet, November 6, 1960, *Edna Miner s. n.* (SMU). San Jacinto County, Coldspring, deep sandy soil in mixed-hardwood forest, Double Lakes Recreation Area in Sam Houston National Forest, November 7, 1957, *Harry D. Thiers s. n.* (SMU).

Matelea edwardsensis Correll, sp. nov.

Vitis implicatus; caulis gracilis, sparsim brevi-pubescens, pilis incurvis vel appressis; folia adversa, sparsim brevi-pubescentia; petioli graciles ad 6 cm.; lamina tenuis, ovata, basi profunde cordata lobis incurvatis et sinu basi truncato vel subtruncato, apice acuta vel abrupte brevi-acuminata, supra fusca viridis, infra pallida viridis; pedunculus axillaris, quam petiolo-subtendente brevior, brevi-pubescens; flores ca. 6, inflorescentia umbelliformi; sepala triangulo-lanceolata, acuminata, brevi-pubescentia; corolla late campanulata, ad infra medium lobata; lobi corollae ovales, apice rotundati, viriduli, infra medium venis parallelis fuscis viridibus, aliter reticulati, intus dense albo-puberuli; corona cum 5 appendicibus, brevibus, claris, rotundatis expansis; omnis appendix cum carina ventrali; folliculus (immaturus) spinosus.

Twining vine; stem slender, sparsely short-pubescent with curved or appressed hairs; leaves opposite, sparsely short-pubescent; petioles slender, up to 6 cm. long; blade thin, ovate, deeply cordate at the base with the lobes incurved and the sinus truncate to subtruncate at its base across the petiole, acute to abruptly short-acuminate at apex, up to 7.5 cm. long and 7 cm. wide, dark green on upper surface, pale green on lower surface; peduncle axillary, much-abbreviated, up to 1.2 cm. long, greatly exceeded by the subtending petiole, short-pubescent, supporting about 6 flowers in an umbelliform inflorescence; pedicels slender, up to 1 cm. long; sepals triangular-lanceolate, acuminate, short-pubescent, about 3 mm. long; corolla broadly campanulate, lobed to below the middle; corolla-lobes oval, rounded at apex, greenish, with parallel dark green veins below the middle and with reticulate veins above and along the margins to the sinuses, sparsely short-pubescent on outer surface, densely white-puberulent on inner surface, about 8 mm. long (to base) and 4 mm. wide; crown with 5 short distinct rounded spreading appendages, each appendage with a central ventral keel; follicle (immature) spiny.

TEXAS: Bexar County, in stony, gravelly soil along Cibolo Creek, about 1 mile northwest of Selma, vine with greenish flowers, climbing, May 9, 1964, *D. S. Correll & C. Earle Smith, Jr. 29540 p.p.* Real County, Lookout over Frio River, along rte. 83, several miles northeast of Leakey, vine, flowers greenish, May 10, 1964, *D. S. Correll & C. Earle Smith, Jr. 29598* (type, LL). San Saba County, rocky shades, San Saba, April (year lacking), *J. Reverchon 1329 p.p.* Travis County, limestone hills near Lake Austin, April 25, 1942, *B. C. Tharp 44–80.*

This species is apparently endemic to the Edwards Plateau in Central Texas. It is related to *M. alabamensis* (Vail) Woodson, of coastal Alabama, and *M. reticulata* (Engelm.) Woodson, a species found rather frequently in East, Central and South Texas and in northeastern Mexico. A confusing element is the fact that on the Edwards Plateau *M. reticulata* and *M. edwardsensis* are found growing in proximity. They resemble one another very closely as evidenced by the fact that two of the collections here cited, one by Reverchon from San Saba County and one by Smith and me from Bexar County, are mixtures of the two. It was due to a close examination of these mixed collections that made me first realize that I was dealing with two, instead of one, species. Where these two species occur together *M. reticulata* will be found to be much further advanced, seasonally, than *M. edwardsensis*. In our collection from Bexar County *M. reticulata* was in full anthesis whereas *M. edwardsensis* was only in very immature bud, thus revealing a pronounced difference in their flowering period.

Matelea edwardsensis differs from *M. reticulata* in being invested with short curved hairs instead of by both long spreading hairs and a short glandular-puberulence, petiole exceeding the peduncle instead of the reverse, the corolla densely puberulent on its inner surface and with only straight veins in the middle of each lobe instead of being glabrous and reticulate-veined throughout. Also, the crown, with its rounded entire lobes, sets it apart not only from *M. reticulata* but also from *M. alabamensis*, whose crown-lobes are distinctly erose.

In 1964, Shinners (Sida 1(6): 362–364) summarized eleven species for Texas in this extremely polymorphic genus. The paradox of outward apparent similarity and yet of striking differences in detailed anatomy of many of the species comprising *Matelea*, as revealed when examined critically, is further emphasized by the finding of the present two species in Texas.

Matelea radiata Correll, sp. nov.

Vitis tenuis, implicatus; caulis puberulus pilis appressis; folia adversa; petiolus gracilis, puberulus, ca. 5 mm. longus; lamina crassa, anguste triangularo-lanceolata, ad basim leviter sagittata vel subcordata, ad apicem acuta, sparsim puberula vel glabrescens, marginibus revolutis; flos solitarius axillaris, fere flore segundo in gemmam abortivo, cum pedunculo-pedicello quam petiolo subtendente breviore; sepala triangularo-lanceolata, acuta, extra sparsim puberula; corolla rotata, glabra; lobi basi conjugati, patulo-radiati, lineato-oblongati, apice obtusi; appendices coronae

oblongato-quadratae, ad apicem truncatum late concavo-emarginatae, cum carina ventrali.

Slender twining vine; stem puberulent with appressed hairs; leaves opposite; petiole slender, puberulent, 5 mm. long or less; blade thick, narrowly triangular-lanceolate, shallowly sagittate to subcordate at the base, acute at apex, up to 2.2 cm. long and 7 mm. wide at base, sparsely puberulent to essentially glabrous, the margins somewhat revolute; flower solitary in leaf-axils, commonly with a second flower aborted in bud, on a much-abbreviated combined peduncle-pedicel that is shorter than the subtending petiole; sepals triangular-lanceolate, acute at apex, very sparsely puberulent on the outer surface, about 2.5 mm. long; corolla rotate, apparently reddish brown, glabrous; corolla-lobes united near base, spreading-radiate, linear-oblong, obtuse at apex, about 7 mm. long (to base) and 2 mm. wide; appendages of crown about 2 mm. long, oblong-quadrate, broadly concave-emarginate at the truncate apex, with a flange-like keel arising at the base on the ventral surface and often extended to well above the middle.

TEXAS: Brooks County, Falfurrias, June 24, 1909, *F. L. Lewton 828* (type, NA no. 271771).

Superficially, this species resembles the uncommon *M. sagittifolia* (Gray) Woodson and the rare *M. parvifolia* (Torr.) Woodson, both of which are found in Texas. The leaves of all three are quite similar. However, the much larger and differently shaped flowers of *M. radiata* readily separate it from *M. parvifolia* and the prominently thin-lobed crown distinguishes it from *M. sagittifolia* with its unlobed thickened crown.

HACKELIA VIRGINIANA (L.) I. M. Johnst., Contrib. Gray Herb. n. s. 68: 45. 1923.

TEXAS: Hemphill County, floodplain open woods off Highway 2266 from Canadian to Lake Marvin, about 1 mile from Highway 60, August 28, 1964, *D. S. Correll & Helen B. Correll 30035*.

In the Boraginaceae in Lundell's *Flora of Texas*, published in early 1964, Ivan Johnston included two species of *Hackelia*, *H. floribunda* (Lehm.) I. M. Johnst. and *H. grisea* (Woot. & Standl.) I. M. Johnst., from the Trans-Pecos. The present species from the Rolling Plains in the Texas Panhandle is new to the state. It had previously been known to occur as far southwest as Oklahoma and Louisiana. The nutlets of *H. virginiana* are subequally prickly over the entire back or face whereas those of *H. flori-*

bunda and *H. grisea* are only marginally prickly and are smooth or only verrucose on the face or back.

AMSINCKIA INTERMEDIA Fisch. & Mey., Ind. Sem. Hort. Petrop. 2: 2,26. 1836.

TEXAS: Brewster County, March 15–23, 1941, *B. H. Warnock 429.*

This western species is new to Texas. It represents a range extension from western New Mexico. The specimen is without a definite locality. It differs from *A. lycopsoides* Lehm. and *A. micrantha* Suksd., the other two species attributed to Texas, in having its orange-yellow, open-throated, funnelform corolla conspicuously exserted beyond the calyx.

Lycium berberioides Correll, sp. nov.

Frutex intricatus, patulus, ramoissimus et spinosus; ramuli parvi cani; folia glauca, elliptica vel elliptico-obovata, obtusa vel ad apicem rotundata, glabra; flores 1 vel 2 ad nodos; pedicelli crassi, glauci; calyx glaucus, glabrus; lobi calycis ovati, obtusi quam tubus longi et reflexi; corolla infundibuliformis, glauco-cana; lobuli corollae triangularo-ovati plerumque valde reflexi; stamina inclusa; stylus inclusus; fructus glaucus.

Intricate spreading shrub up to about 1.5 m. high, profusely branched and spiny, the entire plant (when observed in the field) silvery- or dusty-gray; older stems dark brown to blackish, the new branchlets grayish white; leaves gray-glaucous, elliptic to elliptic-obovate, obtuse to rounded at apex, veiny and somewhat marginate, glabrous or rarely with a few scattered hairs, up to 2.5 cm. long and 8 mm. wide, usually much smaller; flowers borne 1 or 2 at the nodes; pedicels glaucous, stout, 1–5 mm. long at anthesis; calyx glaucous, 4–6 mm. long, the usually reflexed ovate obtuse lobes (with somewhat revolute margins) as long as the tubular portion; corolla funnelform, greenish white and green-lined within the tube, about 1 cm. long, the small triangular-ovate subacute lobes about 3 mm. long and usually strongly reflexed; stamens and style included; fruit (immature) glaucous

TEXAS: Brewster County, creosote-shrub draw about 3 miles south of Persimmon Gap, Big Bend National Park, shrub to 1 m. tall, spreading, intricate, stems blackish, leaves glaucous, flowers white-green, pale green in tube, June 15, 1964, *D. S. Correll, Howard S. Gentry & Craig A. Hanson 29712* (type, LL; isotypes, US, TEX, GH); stony flats, creosote shrub association, about 3 miles south of Persimmon Gap, abundant, shrub 1.5 m. high, flowers greenish-white, green-lined within, April 5, 1947, *Rogers McVaugh 7835* (NA, SMU); near mouth of Juniper Canyon, desert scrubland, Chisos Mts., Big Bend National Park, plants glaucous, June 16, 1964, *D. S. Correll, Howard S. Gentry & Craig A. Hanson 29714.*

In Texas, this species is apparently confined to extreme southern Brewster and southeast Presidio counties. It is unquestionably related to *L. puberulum* A. Gray. However, that species has its non-glaucous leaves, pedicels and calyx densely covered with a glandular-puberulence. The triangular-ovate calyx-lobes are also erect or only slightly spreading and eventually they clasp the fruit. The corolla-lobes, too, in that species are also only spreading and not reflexed.

Lycium texanum Correll, sp. nov.

Frutex intricatus, spinosus; ramulis spadiceis et hispidulis; folia lineo-oblanceolata vel anguste spathulata, hispidulo-puberula, mucronulata ad apicem rotundatum; flores 2 ad nodos; pedicelli hispiduli; calyx pusillus, scariosus, hispidulus, lobulatus et bilabiatus; corolla infundibuliformis; lobuli corollae leviter ciliati, valde reflexi; stamina exserta; stylus exsertus.

Intricate spiny shrub, the young branchlets brownish and hispidulous; leaves linear-oblanceolate to narrowly spatulate, hispidulous-puberulous, often mucronulate at the obtusely rounded apex, up to 2 cm. long and 3 mm. wide, usually much smaller; flowers borne 2 to a node; pedicels (at anthesis) about 1.5 mm. long, becoming much longer in fruit, hispidulous; calyx minute, scarious, hispidulous, 2–3 mm. long, minutely lobed and somewhat 2-lipped; corolla funnelform, 7–8 mm. long, the small slightly ciliate lobes strongly revolute; stamens and style somewhat exserted; fruit subglobose, 4 mm. or more in diameter.

TEXAS: Hudspeth County, infrequent thorny shrub, Quitman Mountains, 10 miles west of Sierra Blanca, 4600 ft. alt., September 6, 1955, *Barton H. Warnock 13831* (type, LL). Culberson County, infrequent shrub, in sandy soil along highway ten miles east of Van Horn, 4200 ft. alt., September 29, 1956, *Barton H. Warnock 14316* (LL).

The hispidulous-puberulous characteristic resembles *L. puberulum*, but the small narrow leaves and floral differences readily set this species apart from that species.

SAMBUCUS CAERULEA Raf., Alsog. Amer. 48. 1838.

TEXAS: Brewster County, Chisos Mts., Big Bend National Park, only one shrub seen on talus at base of cliffs, Emory Peak, flowers cream-color, June 17, 1964, *D. S. Correll 29746*.

As far as I know, this is the first report of this typically far-western species from Texas. It had previously been found as far east as Arizona. It may be distinguished from *S. mexicana* Presl., the only other species

found in Trans-Pecos Texas, not only in its montane, not lowland, habitat but in its narrowly lanceolate leaflets that are manifestly asymmetrical at the base.

VALERIANA ARIZONICA A. Gray, Proc. Amer. Acad. 19: 81. 1884.

TEXAS: Culberson County, rare in moist areas; perennial in limestone soil; top of McKittrick Canyon, Guadalupe Mts., alt. 8,000 ft., September 5, 1954, *B. H. Warnock 12004*.

This species is new to Texas. It had previously been known to occur only in southern Utah and Arizona. It is easily separated from *V. texana* Steyerm., the only other species found in Texas, by the typically broadly ovate leaf-blade that terminates a slender petiole and is broadly rounded to cordate at the base, whereas the elliptic leaf-blade of *V. texana* is cuneate and tapering at the base. Also, instead of the woody rootstock as in *V. texana*, this species has a distinct rhizome with abundant adventitious roots. The plant was collected in sterile condition, but there is no question as to its identity. It is worthy of note that this species was collected near the summit of McKittrick Canyon while *V. texana* has been found only in the lower part of the canyon near its mouth.

THE GENUS SCLERIA IN THE YUCATAN PENINSULA

Earl L. Core

Specimens studied in the preparation of this paper are from the Lundell Herbarium of Texas Research Foundation, the University of Michigan, the Chicago Natural History Museum, Smithsonian Institution (United States National Herbarium), the New York Botanical Garden, the Missouri Botanical Garden, and West Virginia University.

Key to the Species

1. Hypogynium obscure or none.
   2. Inflorescence simple.
      3. Achene essentially smooth.
         4. Inflorescence interruptedly glomerate-spicate.....2. *S. hirtella.*
         4. Inflorescence a single cluster at the summit of the culm.....3. *S. georgiana.*
      3. Inflorescence reticulate or verrucose.
         5. Bracts glabrous.....4. *S. verticillata.*
         5. Bracts hirsute.
            6. Achene deeply muricate-reticulate.....5. *S. pinetorum.*
            6. Achene sparsely tuberculate.....1. *S. interrupta.*
   2. Inflorescence more or less branched.
      7. Achene smooth.....6. *S. lithosperma.*
      7. Achene fenestrate-reticulate.
         8. Leaves 3–11 cm. long.....7. *S. micrococca.*
         8. Leaves 8–27 cm. long.....8. *S. areolata.*

1. Hypogynium present.
   9. Hypogynium margin ciliate, fimbriate, or serrate.
      10. Hypogynium ciliate on the margin.
         11. Achene very large, 3.5–6 mm. long.....9. *S. macrophylla.*
         11. Achene smaller, 1–3 mm. long.

12. Achene 1–2 mm. long; leaves 7–11 mm. wide.....10. *S. microcarpa.*
12. Achene 2–3 mm. long; leaves 10–60 mm. wide.
    13. Style-base black, usually persistent.....11. *S. mitis.*
    13. Style-base brown, rather early deciduous.....12. *S. Eggersiana.*

10. Hypogynium margin fimbriate or serrate.
    14. Inflorescence and achenes purplish-violet.....13. *S. arundinacea.*
    14. Inflorescence brown; achenes white.....14. *S. latifolia.*

9. Hypogynium 3-lobed, the lobes entire.
    15. Upper part of the panicle bearing only staminate spikelets, lower part bearing only pistillate spikelets.....15. *S. bracteata.*
    15. Staminate and pistillate spikelets intermixed throughout the inflorescence.
        16. Achene verrucose, reticulate, or papillate.
            17. Hypogynium tuberculate.
                18. Hypogynium bearing 3 tubercles...16. *S. ciliata.*
                18. Hypogynium bearing 6 tubercles.....17. *S. pauciflora.*
            17. Hypogynium not tuberculate.....18. *S. Muhlenbergii.*
        16. Achene smooth.
            19. Achene purplish-violet or variegated with white.....19. *S. melaleuca.*
            19. Achene white.
                20. Ligule with a very conspicuous scarious appendage.....21. *S. secans.*
                20. Ligule unappendaged.....20. *S. pterota.*

1. SCLERIA INTERRUPTA Rich. Act. Soc. Hist. Nat. Paris 1: 113. 1792.

Hypoporum interruptum Nees, Linnaea 9: 303. 1834. Based on *Scleria interrupta* Rich.

Hypoporum distans Nees, in Mart. Fl. Bras. 2(1): 171 (in note). 1842 (*fide* Clarke, Symb. Ant. 2: 139. 1900).

Scleria hirtella var. β Boeck. Linnaea 38: 440. 1874.

Scleria distans var. *interrupta* Kükenth. Repert. Sp. Nov. 23: 214. 1926. Based on *Scleria interrupta* Rich.

Annual, with fibrous roots; culms 15–50 cm. high, triangular, sparsely hirsute with long white hairs or rarely glabrate; leaves 5–20 cm. long, 1–2 mm. wide, pubescent, flat, linear; sheaths pubescent; ligule minute, with a tuft of hairs, or none; inflorescence glomerate-spicate, 5–10 cm. long; glomerules 5–13; rachis hirsute; spikelets 2–4 mm. long; bractlets linear, hirsute with long white (or sometimes dark-brown) hairs; staminate scales lanceolate; pistillate scales ovate, purplish-tinged, the keel ciliate, mucronate; hypogynium none; achene sparsely rugose-verrucose or tuberculate, 1–1.5 mm. long, mucronate, trigonous, 12-porose at the attenuate base.

DISTRIBUTION: Savannas and pinelands, West Indies to Central America, French Guiana and Brazil.

BRITISH HONDURAS: Honey Camp, *C. L. Lundell 641;* Bakers Pine Ridge, Belize District, *Lundell 6991* (in part), *7017;* west of Boomtown, *Hugh O'Neill 8896.*

2. SCLERIA HIRTELLA Sw. Prodr. Veg. Ind. Occ. 19. 1788.

Carex hirtella Gmel. Syst. Nat. 2: 138. 1791. Based on *Scleria hirtella* Sw.

Scleria interrupta Michx. Fl. Bor. Am. 2: 168. 1803; not Rich. Act. Soc. Hist Nat. Paris 1: 113. 1792. "Carolina ad Floridam."

Cenchrus hirsutus Spreng. Neue. Entdeck. 3: 15. 1822 (*fide* Kunth, Enum. Pl. 1: 166. 1833). Type locality, Hispaniola.

Hypoporum humile Nees, Linnaea 9: 303. 1834.

Hypoporum hirtellum Nees, Linnaea 9: 303. 1834 (*fide* Britton, Ann. N. Y. Acad. Sci. 3: 236. 1885).

Hypoporum interruptum Torr. Ann. Lyc. N. Y. 3: 382. 1836. Based on *Scleria interrupta* Michx.

Scleria cenchroides Kunth, Enum. Pl. 2: 352. 1837 (*fide* Boeck. Linnaea 38: 440. 1874). "Cap. b. spei; ad oram orientalem legit Drège."

Scleria hirta Willd.; Kunth, Enum. Pl. 2: 352, in syn. 1837. "Willd. herb. n. 17329 (forma fructu laevi)."

Scleria mollis Kunth, Enum. Pl. 2: 352. 1837. (*fide* Boeck. Linnaea 38: 440. 1874). "Brasilia meridionalis."

Scleria nutans Willd.; Kunth, Enum. Pl. 2: 351. 1837 (*fide* Britton, Ann. N. Y. Acad. Sci. 3: 235. 1885). "Guiana, Brasilia, Chili, Mexico."

Scleria interrupta Kunth, Enum. Pl. 2: 352, in part (as to syn. *S. hirta*). 1837.

Scleria pulchella Nees, in Mart. Fl. Bras. 2(1): 170, in syn. 1842.

Anerma hispidula Schrad. in sched., *fide* Nees, in Mart. Fl. Bras. 2(1): 170. 1842.

Hypoporum nutans Nees, in Mart. Fl. Bras. 2(1): 170. 1842. Based on *Scleria nutans* Kunth.

Scleria Michauxii Chapm. Fl. S. U. S. 532. 1860. Based on *Scleria interrupta* Michx.

Scleria hirtella var. *pauciciliata* Britton, Ann. N. Y. Acad. Sci. 3: 236. 1885.

Scleria humilis Britton, Ann. N. Y. Acad. Sci. 3: 235. 1885. Here ascribed to Nees (Linnaea 9: 303. 1834), who did not make this combination.

Perennial by an elongate aromatic horizontal rhizome; culms 15–65 cm. high, erect, slender, glabrous or pubescent near the apex, acutely triangular; leaves 4–20 cm. long, 2–5 mm. wide, linear, flat, pubescent or rarely nearly glabrous; sheaths hirsute; ligule minute or none; inflorescence interruptedly glomerate-spicate, simple, terminal, 4–12 cm. long, of 3–9 sessile, often nodding, more or less remote glomerules; rachis pubescent; bractlets long-pilose; staminate scales obtuse, brown, hirsute on the back; pistillate scales broader, cuspidate, brown; spikelets 4–5 mm. long, castaneous, ferruginous or dark-red-brown to almost black; hypogynium none; achene 1–2 mm. long, obovoid to subglobose, white, smooth, shining, mucronulate, obscurely trigonous, the base cuneate-attenuate, not porose, or lightly 9–12 excavated.

DISTRIBUTION: Abundant in wet grassy lands, pine barrens and savannas, southern United States to northern Argentina and Chile.

TABASCO: Between San Fernando and Santa Lucia, *J. N. Rovirosa 1021.*
PETEN: La Libertad, *M. Aguilar H. 109;* La Libertad, *C. L. Lundell 3593.*
BRITISH HONDURAS: Gracie Rock Pine Ridge, Sibun River, *Percy H. Gentle 1555;* San Agustin, El Cayo District, *Lundell 6681;* Augustin, El Cayo District, *D. R. Hunt 12;* Swasey Branch, Monkey River, Toledo District, *Gentle 3844;* near Punta Gorda, Toledo District, *Gentle 6748;* San Antonio–Punta Gorda Road, Toledo District, *Gentle 6622;* Commerce Bight Pine Ridge, Stann Creek District, *Gentle 8281.*

3. SCLERIA GEORGIANA Core, Brittonia 1: 243. 1934.

Scleria gracilis Ell. Sketch Bot. S. Carol. Georgia 2: 557. 1824, not Rich. Act. Soc. Hist. Nat. Paris 1: 113. 1792.
Hypoporum gracile Torr. Ann. Lyc. N. Y. 3: 381. 1836. Based on *Scleria gracilis* Ell.

Rhizome horizontal, 3–5 mm. thick, nodulose; culms 30–50 cm. tall, slender, wiry, triangular, glabrous; leaves 12–16 cm. long or longer, 1–2 mm. wide, few, glabrous, linear or filiform, involute, resembling the stem, shorter than the stem; sheaths glabrous, the lower ones bladeless; ligule lacking; inflorescence a single terminal fascicle of 2–5 spikelets; lower bract 1–8 cm. long, 1–2 mm. wide, appearing like a continuation of the culm; spikelets 5 mm. long; bractlets glabrous, lanceolate; scales red-brown, glabrous, the staminate lanceolate, acuminate, the pistillate ovate-lanceolate, acuminate; hypogynium none; achene 2 mm. long, white, smooth, usually longitudinally ridged, dull, 6-porous near the base, ovoid, shorter than the scales, the base triangular.

DISTRIBUTION: Savannas and pinelands, North Carolina to Texas, Cuba, Jamaica, and British Honduras.

BRITISH HONDURAS: East of Boomtown, *Hugh O'Neill 8889;* near Honey Camp, *Wm. C. Meyer 107;* Jenkins Creek, north of Monkey River, *Percy H. Gentle 4111;* Bakers Pine Ridge, Belize District, *C. L. Lundell 3822, 6976, 7016;* Belize-Cayo Road, Belize District, *Gentle 9452, 9512;* Savannah Forest Station, Stann Creek District, *D. R. Hunt 4321;* Commerce Bight Pine Ridge, Stann Creek District, *Gentle 8308.*

4. SCLERIA VERTICILLATA Muhl.; Willd. Sp. Pl. 4: 317, excl. syn. Michx. 1805.

Hypoporum verticillatum Nees, Linnaea 9: 303. 1834. Based on *Scleria verticillata* Muhl.

Hypoporum diffusum Nees, Linnaea 9: 303. 1834, fide Boeck. Linnaea 38: 446. 1874.

Scleria diffusa Michx; Kunth, Enum. Pl. 2: 359. 1837. Based on *Hypoporum diffusum* Nees.

Scleria tenuiflora Willd.; Kunth, Enum. Pl. 2: 353. 1837, in syn. "Willd. herb. n. 17331 e Sierra Leona, (an patria recte notata?)."

Scleria tenella Kunth, Enum. Pl. 2: 353. 1837. Type locality, Guiana.

Hypoporum tenellum Nees, in Mart. Fl. Bras. 2(1): 171. 1842. Based on *Scleria tenella* Kunth.

Scleria Kunthiana Steud. Syn. Pl. Cyp. 176. 1855.

Scleria hirtella var. *glabrescens* Boeck. ms. in *C. Wright 3417* (*fide* Clarke, Symb. Ant. 2: 139. 1900).

Scleria verticillata f. *brevis* Kükenth. Repert. Sp. Nov. 23: 214. 1926. Type locality, Cuba: prov. Pinar del Rio, Herradura (*Ekman 17730,* Oct. 21, 1923).

Scleria verticillata f. *capillaris* Kükenth. Repert. Sp. Nov. 23: 214. 1926. Type locality, Cuba: prov. Pinar del Rio, Laguna Santa Maria (*Ekman 17275,* Aug. 23, 1923).

Scleria verticillata var. *tenella* Kükenth. Bot. Jahrb. 56: Beibl. 125: 20. 1921. Type locality, Brazil: Rio Branco, Serra do Mel (*Ule 8063,* in part).

Annual, with capillary fibrous roots fragrant in drying; culms simple, triquetrous, glabrous, 1–6 dm. high, slender or filiform, erect, sometimes minutely pubescent; leaves 0.5–3 dm. long, shorter than the stem, 0.5–2 mm. wide, glabrous, linear or filiform, flat; sheaths usually pilose; inflorescence interruptedly glomerate, simple, of 2–8 erect glomerules, 4–15 cm. long; spikelets 2–3 mm. long, castaneous, few-flowered, alternate, sometimes appearing as if verticillate, sessile; bracts glabrous, 6–7 mm. long, often caudate; bractlets glabrous; scales glabrous, oblong-lanceolate, red-brown, keeled; hypogynium none; achene 1 mm. long, reticulate or verrucose, trigono-globose, white, fragile, mucronate, about 5-porose just above the attenuate trigonous base.

DISTRIBUTION: Wet sandy soil and cultivated grounds, southern Ontario, West Indies and Central America to northern Brazil.

BRITISH HONDURAS: Belize-Cayo Road, Belize District, *Percy H. Gentle 9419, 9497;* Monkey River, Toledo District, *Gentle 3637.*

5. SCLERIA PINETORUM Britton, Bull. Torrey Club 42: 492. 1915.

Annual with fibrous roots; culms slender, erect, 1.5–4 dm. high, villous or glabrous; leaves sparsely pubescent with spreading hairs, 1–2 mm. wide; sheaths villous; ligule short, triangular, pubescent, or none; inflorescence interruptedly glomerate, 2–8 cm. high, of 2–12 glomerules; bractlets narrow, ciliate with long hairs; scales lanceolate-acuminate, long-pilose; hypognium none; achene 1–2 mm. long, white, reticulate, globular, the base short-attenuate, trigonous, with a row of pits on each side.

DISTRIBUTION: Pine woods and savannas, Cuba, Haiti, and British Honduras.

BRITISH HONDURAS: Swasey Branch, Monkey River, Toledo District, *Percy H. Gentle 3767;* Belize-Cayo Road, Belize District, *Gentle 9422.*

6. SCLERIA LITHOSPERMA (L.) Sw. Prodr. Veg. Ind. Occ. 18. 1788.

Scirpus lithospermus L. Sp. Pl. 51 in part. 1753. "Habitat in India."
Schoenus lithospermus L. Sp. Pl. ed. 2. 65 in part 1762. "India occidentalis"; based on *Scirpus lithospermus* L.
Scleria tenuis Retz. Obs. 4: 13. 1786 (*fide* Boeck. Linnaea 38: 452. 1874).
Scleria filiformis Sw. Prodr. Veg. Ind. Occ. 19. 1788. Type locality, West Indies.
Carex subulata Gmel. Syst. Nat. 2: 138. 1791. Based on *Scleria filiformis* Sw.
Carex tenuis Gmel. Syst. Nat. 2: 138. 1791. Based on *S. tenuis* Retz.
Carex lithosperma Gmel. Syst. Nat. 2: 137. 1791. Based on *Scirpus lithospermus* L.
Scleria gracilis Rich. Act. Soc. Hist. Nat. Paris 1: 113. 1792 (*fide* Willdenow). Type locality, French Guiana (*Leblond*).
Scleria purpurea Poir. in Lam. Encyc. 7: 4. 1806 (*fide* Kunth, Enum. Pl. 2: 348. 1837). "Cette plante croit en Amérique, à L'ile Saint-Thomas."
Scleria capillaris R. Br. Prodr. 240. 1810 (*fide* Boeck. Linnaea 38: 453. 1874).
Scleria glaucescens Presl. Rel. Haenk. 1: 202. 1828 (*fide* Nees, in Wight, Contrib. Bot. 117. 1834). "Hab. in insula Luzon." (*Haenke*).
Scleria elongata Presl. Rel. Haenk. 1: 202. 1828. "Hab. ad portum Acapulco in regno Mexicano" (*Haenke*).
Hypoporum purpurascens Nees, Linnaea 9: 303. 1834 (*fide* Kunth, Enum. Pl. 2: 348. 1837.
Hypoporum Sieberi Nees, Linnaea 9: 303. 1834 (*fide* Boeck, Linnaea 38: 453. 1874).
Hypoporum capillare Nees, Linnaea 9: 303. 1834 (*fide* Boeck, Linnaea 38: 453. 1874).
Scleria subulata Steud. Nomencl. ed. 2. 1: 296. 1940. Based on *Carex subulata* Gmel.
Scleria Wightiana Steud. Syn Pl. Cyp. 176. 1855.
Scleria lithosperma var. *filiformis* Britton, Ann. N. Y. Acad. Sci. 3: 231. 1885. Based on *Scleria filiformis* Sw.
Scleria Krugiana Boeck. Cyp. Nov. 1: 35. 1888. Type locality Porto Rico, (*Sintenis 4945*).
Hypoporum lithospermum Nees; B. D. Jackson, Ind. Kew. 1: 1198. 1895. Based on *Scleria lithosperma* Sw.

Perennial by rather short, nodulose rhizomes; culms often clustered, filiform, triquetrous, glabrous, at least towards the summit, 3–6 dm. high; leaves several, often more or less aggregated toward the middle of the culm, 10–20 dm. long, 1–3 mm. wide, involute, glabrous, the margins and keel scabrous; sheaths finely pilose or nearly glabrous, purplish (especially the lower, nearly bladeless ones); ligule short, triangular, rigid, pilose; inflorescence axillary and terminal, simple or branched, of 1–4 distant interrupted spikes, few-flowered, the spikes stalked or the uppermost sessile; spikelets 3–4 mm. long, few-flowered; bracts filiform, glabrous; bractlets glabrous, dark-brown, exceeding the achenes; scales dark-brown, ovate-lanceolate; hypogynium none; achene 2–2.5 mm. long, white, smooth shining, oblong or ovate-elliptic, subacuminate-umbonate, the attenuate trigonous base non-porose.

DISTRIBUTION: Dry thickets and open woods, especially on limestone, in nearly all tropical maritime regions.

CAMPECHE: Tuxpeña, *C. L. Lundell 956.*

YUCATAN: Chichen Itza, *J. C. Bequaert* 91; Pocoboch, *Geo. F. Gaumer 2377;* Peto, *Jason R. Swallen 2676;* Uxmal, *Swallen 2623;* Tizimin, *Swallen 2515, 2581;* Chichen Itza, *W. C. Steere 1636.*

QUINTANA ROO: San Miguel, Cozumel Island, *Swallen 2881;* Tancah, *Swallen 2828.*

PETEN: Dos Arroyos, *H. H. Bartlett 12100;* Tikal National Park, *Elias Contreras 24, 1397;* Tikal National Park, *Lundell 15582, 16197, 16800;* La Libertad, *M. Aguilar H. 187;* La Libertad, *Lundell 3637, 3649.*

BRITISH HONDURAS: Maskall Bank, *Hugh O'Neill 8894, 8909;* San Andres, *Percy H. Gentle 1933;* San Andres, Corozal, *Lundell 4817;* San Agustin, El Cayo District, *Lundell 6816;* Maskall, *Gentle 994.*

7. SCLERIA MICROCOCCA (Liebm.) Steud. Syn. Pl. Cyp. 179. 1855.

— *Hypoporum micrococcum* Liebm. Vidensk. Selsk. Skr. V. 2: 256. 1850. "Samlet i törre Savaner ved Segovia i Nicaragua af Mag. Ørsted i Januar."

— *Hypoporum purpurascens* Liebm. Vidensk. Selsk. Skr. V. 2: 256. 1850; not Nees, Linnaea 9: 303. 1834. "Voxer i törre Savaner ved Mirador i Potrero de Consoquitla, blomstrende i October; ligeledes i Dep. Oajaca ved Talea i August" (Ørsted).

— *Scleria Liebmanni* Steud. Syn. Pl. Cyp. 179. 1855. Based on *Hypoporum purpurascens* Liebm.

— *Hypoporum verticillatum* Nees, Bonplandia 3: 87. 1855; not Nees, Linnaea 9: 303. 1834.

— *Scleria tenella* Griseb. Cat. Pl. Cub. 249, in part. 1866; not Kunth, Enum. Pl. 2: 353. 1837.

— *Scleria luzulaeformis* Wright; Sauv. Anal. Acad. Cienc. Habana 8: 156. 1871. "En sabana cerca de San Juan de Buena Vista, jurisdiccion de Bayamo," (*Wright 3418 pp.*)

Scleria costaricensis Boeck. Alg. Bot. Zeitschr. 2: 157. 1896. "Entre Terraba et Boruca, Costa Rica" (*Tonduz 4634*).

Annual, with fibrous roots; culms filiform, 1–5 dm. high, glabrous or somewhat hairy, triquetrous; leaves 3–11 cm. long, 1–2 mm. wide, somewhat scabrous on the margins, glabrous or hairy, about equaling the culm, more or less involute in drying; sheaths loose, hairy especially towards the top; ligule minute, hairy; inflorescence 5–10 cm. long, virgately branched; glomerules interrupted; rachis pilose to glabrate; lower bract foliaceous; bractlets dark-brown; scales acuminate, dark-brown, often with paler midrib, the staminate lanceolate, the pistillate ovate-lanceolate; hypogynium none; achene 1 mm. long, fenestrate-verrucose, white, shining, apiculate, trigono-globose, shorter than the scales, the base trigonous, attenuate, 5-porose on each face.

DISTRIBUTION: Wet fields; Mexico to northern Brazil, also in Cuba.

BRITISH HONDURAS: Augustine, El Cayo District, *D. R. Hunt 191.*

8. SCLERIA AREOLATA Lundell, Amer. Midl. Nat. 29: 471. 1943.

Annual with fibrous roots; culms up to 35 cm. tall, slender, triquetrous; leaves 8–27 cm. long, 1–2.5 mm. wide, glabrous, sparsely scabrous on the margins and nerves; sheaths reddish, short-pilose; ligule inconspicuous, pilose; inflorescence paniculate, lax, up to 15 cm. long, the branches very slender, up to 5 cm. long; rachis triquetrous, the angles pilose; fascicles small, distant; bracts setaceous, inconspicuous; spikelets about 3 mm. long; scales ovate-lanceolate, acuminate, inconspicuously scabrous on the keel; hypogynium none; achene trigono-globose, 1 mm. long, white, shining, areolate, apiculate, the base trigonous, 4–5-porose on each face.

DISTRIBUTION: Fields, British Honduras.

BRITISH HONDURAS: Swasey Branch, Monkey River, *Percy H. Gentle 4047* (MICH, type; LL, isotype); near Jenkins Creek, north of Monkey River, *Gentle 4194.*

9. SCLERIA MACROPHYLLA Presl. Rel. Haenk. 1: 200. 1828.

Scleria paludosa Poepp. & Kunth; Kunth, Enum. Pl. 2: 344. 1837. "Peruvia (prope Torache, ad fl. Huallagam superiorem, in sylvis paludosis. Poeppig legit."

Ophryoscleria paludosa Nees, in Mart. Fl. Bras. 2(1): 185. 1842. Based on *Scleria paludosa* Poepp. & Kunth.

Scleria palmifolia Hoffmgg.; Schlecht. Bot. Zeit. 3: 492. 1845 (*fide* Boeck. Linnaea 38: 522. 1874). "Salzm. hrbr. Bahia."

Scleria macrocarpa Salzm.: Schlect. Bot. Zeit. 3: 492, as syn. 1845.

Ophryoscleria asperrima Liebm. Vidensk. Selsk. Skr. V. 2: 261. 1851. "Et Exemplar hjembragtes af Mag. Ørsted, samlet ved Bredderne af Rio de S. Juan de Nicaragua i Juni."

Scleria asperrima Steud. Syn. Pl. Cyp. 170. 1855. Based on *Ophryoscleria asperrima* Liebm.

Perennial by stout rhizomes; culms coarse, smooth, or the angles somewhat scabrous, sharply triangular, 1–3 m. high; leaves linear-lanceolate, 5–7 nerved, rigid, attenuate-acuminate, 2–4 dm. long, 1–4.5 cm. wide, smooth or somewhat roughened on the margins and veins beneath; sheaths 3-winged, the wing-margins roughened; ligule short, ovate, obtuse, rigid; inflorescence paniculate, terminal and axillary; branches erect, the spikelets densely clustered; bracts foliaceous; bractlets linear-setaceous, pubescent, especially at the base, elongate; staminate spikelets 4 mm. long, ovate to ovate-oblong; staminate scales lanceolate, acuminate, minutely pubescent; pistillate scales broadly ovate-orbicular, ciliate on the margins, minutely pubescent; hypogynium large, undulately 3-lobed, the margin more or less ciliate; achene subglobose-ellipsoid, white or discolored, smooth, shining, 3.5–6 mm. long, tipped with the somewhat persistent conic pale style base.

DISTRIBUTION: Marshes and swampy forests, Mexico to Brazil and Bolivia.

BRITISH HONDURAS: *J. B. Kinloch 244;* Silkgrass Creek, Stann Creek District, *Percy H. Gentle 8529;* near Jacinto Creek, Toledo District, *Gentle 5563;* near San Antonio, Toledo District, *Gentle 5466*.

10. SCLERIA MICROCARPA Nees, Linnaea 9: 302. 1834.

- *Scleria ovuligera* Reichb.; Nees, Linnaea 9: 303. 1834 (*fide* Kunth, Enum. Pl. 2: 341. 1837).
- *Ophryoscleria microcarpa* Nees, in Mart. Fl. Bras. 2(1): 184. 1842. Based on *S. microcarpa* Nees.
- *Scleria foliosa* Wright; Sauv. Anal. Acad. Cienc. Habana 8: 154, 1871; not A. Rich Tent. Fl. Abyss. 2: 509. 1851 Type locality, Cuba (*Wright 3807*).
- *Scleria latifolia* Balb.: Boeck. Linnaea 38: 517, as syn. 1874.
- *Scleria microcarpa* var. *latifolia* Boeck. Linnaea 38: 517. 1874. Type locality, Guadeloupe.
- *Scleria microcarpa* var. *foliosa* Clarke, Symb. Ant. 2: 149. 1900.

Perennial by horizontal, elongate, rather stout rhizomes; culms sharply triangular, glabrous, 0.5–2 m. high, erect or at length nodding; leaves 20–40 cm. long, 7–11 mm. wide, glabrous or slightly scabrous on the margins; sheaths 3-winged, glabrous or nearly so; ligule 1 cm. or less long, lanceolate, glabrous, rigid; inflorescence paniculate, the panicles axillary and terminal, usually several, erect, very narrow, loosely flowered; lower bract of the inflorescence foliaceous; bractlets linear-subulate, minute; staminate spikelets oblong-ovate; staminate scales ovate, obtuse, stramineous; pistillate scales ovate-orbicular, stramineous; hypogynium-margin more or less densely white-ciliate or ciliolate; achene 1–2 mm. long, exceeding the scales, ellipsoid-ovoid, smooth, white, shining, tipped by the more or less persistent style-base.

DISTRIBUTION: Abundant in swamps, roadsides, and moist thickets, Cuba and Mexico to Paraguay.

TABASCO: Reforma, Balancan, *Eizi Matuda 3228.*
PETEN: Lake Zotz, *C. L. Lundell 3317;* Tikal National Park, *Lundell 16140, 16676.*
BRITISH HONDURAS: Mussell Creek, Boomtown, *Hugh O'Neill 8897;* San. Agustin, El Cayo District, *Lundell 6718:* El Cayo, El Cayo District, *Lundell 6114:* Bakers Pine Ridge, Belize District, *Lundell 3807:* Machaca Creek Forest Reserve, Punta Gorda, *D. R. Hunt 494:* Commerce Bight Pine Ridge, Stann Creek District, *Percy H. Gentle 8325.*

11. SCLERIA MITIS Berg. Vet. Akad. Handl. Stockh. 26: 145. *pl. 5.* 1765.

Schoenus lithospermus L. Sp. Pl. ed. 2. 65, pro parte. 1762 (*fide* Clarke, Symb. Ant. 2: 150. 1900).
Carex lithosperma L. Syst. Veg. ed. 13. 706. 1774 (*fide* Clarke, *loc. cit.* 150).
Carex mitis Gmel. Syst. Nat. 2: 138. Based on *S. mitis* Berg.
Scleria riparia Poepp. & Kunth; Kunth, Enum. Pl. 2: 341. 1837. "Peruvia (prope Tocache, mission del Huallaga alto, in fluviorum ripis paludosis) *Poeppig* legit."
Scleria latifolia Reichb.; Nees, in Mart. Fl. Bras 2(1): 183, as syn. 1842. "Specimen majus ante anthesin decreptum."
Ophryoscleria lucida Nees, in Mart. Fl. Bras. 2(1): 183. 1842. "In silvis prov. S. Pauli et Rio de Janeiro; in campis altis do Paranan et in silvis Minarum Novarum (*Martius*); in Gujana (Weigelt)."
Ophryoscleria mitis Nees, in Mart. Fl. Bras. 2(1): 183. 1842. Based on *Scleria riparia* Poepp. & Kunth.
Scleria praealta Salzm.; Schlecht. Bot. Zeit. 3: 461, as syn. 1845. "In paludosis Bahia."
Scleria lucida Steud. Syn. Pl. Cyp. 168. 1855. Based on *Ophryoscleria lucida* Nees.
Scleria trialata Bertero; Boeck. Linnaea 38: 521, as syn. 1874.
Scleria trinitatis Boeck. Cyp. Nov. 2: 31. 1890 (*fide* Clarke, Symb. Ant. 2: 150. 1900). "Insula Trinitatis."

Perennial by thick woody rhizomes; culms growing in clumps, stout, smooth or slightly roughened on the angles, triquetrous, 1–3 m. tall, strict; leaves 60 cm. or less long, 1–2.8 cm. wide, flat or somewhat plicate, rigid, glabrous, scabrous on the nerves above and on the margins; sheaths 3-winged; ligule 3 cm. long or less, lanceolate, glabrous; panicles 3- or 4, narrow, loosely many-flowered, about 30 dm. long, elongate, the branches erect; lower bract of the inflorescence foliaceous; bractlets very short, setaceous; spikelets short, ovoid; pistillate scales ovate-orbicular, abruptly acuminate; hypogynium truncate, densely fringed with brown or red-brown hairs; achenes ellipsoid, 2–3 mm. long, smooth, white, sometimes black or discolored, lustrous, tipped with the small conic black persistent style-base.

DISTRIBUTION: Clearings and wet banks, Central America and Cuba to Paraguay and eastern Bolivia.

BRITISH HONDURAS: *J. B. Kinloch 235;* Temash River, Toledo District, *Percy H. Gentle 5232;* San Antonio-Punta Gorda Road, Toledo District, *Gentle 6670.*

12. SCLERIA EGGERSIANA Boeck. Cyp. Nov. 2: 41. 1890.

Scleria Grisebachii Clarke, Symb. Ant. 2: 1900. "Hab. in Jamaica: *W. Wright:* Porto Rico: *Eggers n. 432b, 671,* prope Adjuntas ad margines sylvae montis Cedro: *Sintenis n. 1443* partim, *4279;* Antigua: *Nicholson;* Guadeloupe: *Husnot n. 43;* Dominica: *Imray n. 352;* Martinique: *Duss n. 445.*"

Scleria microcarpa Griseb. Cat. Pl. Cub. 248, in part. 1866. "Cuba, *Wright 732b, 724a.*"

Rhizome horizontal, thick, woody; culms coarse, 1–2 m. tall, triangular, erect, nearly smooth; leaves 30 cm. long or longer, 1–2.5 cm. wide, scabrous, especially on the veins and margins, coriaceous, rigid, flat or somewhat plicate; sheaths 3-winged, scabrous on the angles, otherwise glabrous; ligule slightly pubescent, lanceolate-triangular, rigid, 2.5 cm. long or less; inflorescence paniculate, narrow, about 3 dm. long, elongate; branches erect; panicles 4 or 5, terminal and in the upper axils, dense; bracts leaf-like; bractlets setaceous; pistillate scales suborbicular, concave, mucronate, ferruginous; pistillate spikelets sessile; hypogynium-margin densely brown-ferruginous-ciliate, cup-shaped, 3-lobed; achene 2.5–3 mm. long (with the high hypogynium, 4 mm. long), white, globose or subglobose, shining, smooth, terminated by the conic, pale, more or less deciduous style-base.

DISTRIBUTION: Thickets and forest margins, West Indies, Central America, and Guiana.

PETEN: Lake Zotz, *C. L. Lundell 3308, 3312;* Lake Peten Itza, *Lundell 17286.*
BRITISH HONDURAS: Stann Creek, *W. A. Schipp 887:* Golden Stream, Toledo District, *Percy H. Gentle 4525.*

13. SCLERIA ARUNDINACEA Kunth, Enum. Pl. 2: 347. 1837.

Scleria latifolia Nees, Flora 11: 303. 1828; Boeck. Linnaea 38: 530. 1874; not Sw.
Scleria sylvestris Poepp. & Kunth, Enum. Pl. 2: 346. 1837. "Provincia Peruviana Huanuco (in sylvis ad Cuchero). Poeppig legit."
Scleria cyanocarpa Kunth, Enum. Pl. 2: 347. 1837. "Brasilia meridionalis. Sellow legit."
Schizolepis latifolia Nees, in Mart. Fl. Bras. 2(1): 186. 1842. Based on *Scleria latifolia* Sw.
Schizolepis trigonocarpa Nees, in Mart. Fl. Bras. 2(1): 186. *pl. 26.* 1842. "In silvis prov. Maragnaniensis et Paraënsis" (*Martius*).
Scleria silvestris Nees, in Mart. Fl. Bras. 2(1): 188. 1842; variant spelling.
Schizolepis silvestris Nees, in Mart. Fl. Bras. 2(1): 223–224 (index). 1842.
Scleria grandifolia Miq. Linnaea 19: 230. 1847 (*fide* Boeck, Linnaea 38: 532. 1847. "Crescit ad Osembo in Para" *Focke*).
Scleria Kappleriana Hochst.; Steud. Syn. Pl. Cyp. 172, as syn. 1855.

— *Scleria trigonocarpa* Steud. Syn. Pl. Cyp. 171. 1855. Based on *Schizolepis trigonocarpa* Nees.
— *Schizolepis arundinacea* Palla, Denks, Acad. Wien 79: 196. 1908. Based on *Scleria arundinacea* Kunth.
— *Scleria latifolia* var. *arundinacea* (Kunth) Pfeiff. Rep. Spec. Nov. 52: 171. 1943.

Rhizome short, massive; culms sharply triangular, tufted, 0.4–2 m. tall, angles roughened, otherwise glabrous, robust; leaves about 4 in number, lanceolate, 40–50 cm. long, 2.5–5.3 cm. wide, glabrous, flat or more or less plicate, rather abruptly narrowed near the tip, scabrous on the margin; lower bract of the inflorescence 10–25 cm. long, 1–4.5 cm. wide, retrorsely scabrous on the margins; sheaths inflated, loose, broadly 3-winged, the wings scabrous, often purplish-tinged, glabrous or sparsely pilose; ligule 4–13 mm. long, triangular-ovate, obtuse, rigid, glabrous or somewhat pubescent; inflorescence paniculate, axillary and terminal, conic or pyramidal, much branched, 20 cm. high, purple; rachis scabrous; bractlets filiform, 1–3 mm. long; pistillate scales ovate, purplish, midrib green, excurrent margin ciliolate; staminate spikelets lanceolate, 3 mm. long; hypogynium 3-lobed, the lobes fimbriate, the fimbriations 1 mm. long, rigid, purple; achene 2–3 mm. long, white, tinged with dark purple to black, smooth, shining, depressed-globose or sometimes trigonous towards the apex. This is perhaps merely a color form of *S. latifolia* Sw.

DISTRIBUTION: In forests and clearings, Central America and the Lesser Antilles south to eastern Bolivia, Paraguay, and northern Argentina.

BRITISH HONDURAS: *J. B. Kinloch 243;* Silkgrass Forest Reserve, *Yale School of Forestry 5;* Big Creek, Stann Creek District, *Percy H. Gentle 2148;* Mountain Pine Ridge, El Cayo District, *H. H. Bartlett 11718;* Near Vaca, El Cayo District, *Gentle 2427;* Silkgrass Creek, Stann Creek District, *Gentle 8519;* Monkey River-Cockscomb, Toledo District, *Gentle 4285;* near Columbia, Toledo District, *Gentle 6084.*

14. SCLERIA LATIFOLIA Sw. Prodr. Veg. Ind. Occ. 18. 1788.

— *Carex latifolia* Gmel. Syst. Nat. 2: 138. 1791. Based on *S. latifolia* Sw.
— *Scleria nervosa* Wikstr. Vet. Akad. Handl. 1827; 75. 1827 (*fide* Clarke, Symb. Ant. 2: 152. 1900). Type locality, Guadeloupe.
— *Scleria Loefgreniana* Boeck. Vidensk. Meddel. 1894: 240. 1895. Type locality, Fazenda Campo Grande, São Paulo, Brazil (*Edwall 1977*).
— *Scleria lacunosa* Boeck. Allg. Bot. Zeitschr. 2: 160. 1896. Type locality, "India occident."

Rhizome thick; culms triquetrous, sparingly pilose, strict, 1 m. tall or taller; leaves 45–60 cm. long, 2–5 cm. wide, abruptly narrowed towards the apex, lanceolate, glabrous, margins and nerves scabrous; sheaths narrowly 3-winged, the wings scabrous, sparingly pilose, or broadly winged, the wings short, tapering downwards; ligule 5–8 mm. long, tri-

angular-ovate, strongly nerved, rigid, pilose or glabrous, margin cartilaginous; inflorescence subpyramidal, terminal and axillary, dense, the branches rigid, the peduncles compressed, scabrous, pubescent; lower bract of the inflorescence foliaceous, 15 cm. long or longer, 1 cm. wide; bractlets setaceous-capillary; pistillate scales membranaceous, exceeding the achene, ovate, mucronate, brown, minutely pubescent, the midrib green; staminate spikelets 3–4 mm. long, lanceolate, short-pediceled; hypogynium 3-lobed, the lobes deeply and irregularly fimbriate, the fimbriations brown or purplish; achene depressed-globose, white or purplish, smooth, 3 mm. long.

DISTRIBUTION: Moist shady places, Central America and the Lesser Antilles south to eastern Bolivia.

BRITISH HONDURAS: Swasey Branch, Monkey River, Toledo District, *Percy H. Gentle 3998.*

15. SCLERIA BRACTEATA Cav. Ic. 5: 34, *pl. 457*. 1799.

— *Scleria floribunda* HBK. Nov. Gen. & Sp. 1: 233. 1816 (*fide* Kunth, Enum. Pl. 2: 345. 1837). "Crescit locis temperatis, scopulosis regni. Novogranatensis inter Pandi et Fusagasuga, alt. 450–900 hex."

Scleria papillata Willd.; Kunth, Enum. Pl. 2: 345, as syn. 1837. Type locality, Brazil.

Macrolomia bracteata Schrad.; Nees, in Mart. Fl. Bras. 2(1): 182, *t. 24*. 1842. Based on *Scleria bracteata* Cav.

~ *Scleria rigens* Salzm.; Steud. Syn. Pl. Cyp. 171, as syn. 1855.

~ *Scleria bracteata* f. *simplicior* Kükenth. Repert. Sp. Nov. 26: 253. 1929. Type locality, Tipuani, Bolivia (*Buchtein 5107*).

Scleria bracteata var. *floribunda* (HBK) Pfeiffer, Rev. Sudam. Bot. 5: 173. 1938 ("Venezuela").

~ *Scleria bracteata* var. *supra-gynaecea* Pfeiffer, Rev. Sudam. Bot. 5: 174. 1938.

Perennial by thick horizontal nodose rhizomes; culms 0.6–3 m. high, coarse, smooth, triangular, ascending, at length diffuse, sub-scandent, sprawling on bushes, very leafy; leaves 15–45 cm. long, 6–18 mm. wide, flat, 3-nerved, the margins serrulate-scabrous, rough on both surfaces, especially beneath, tapering gradually from the base into a caudate tip, short-pubescent on both sides; sheaths purplish, villous-hirsute; ligule about 4 mm. long, ovate, obtuse, rigid, hirsute; inflorescence paniculate, the peduncles lateral and terminal, the upper staminate, the lower pistillate (rarely with an occasional pistillate flower in the staminate portion), brown, the rachis scabrous-hirsute; bracts of the pistillate inflorescence conspicuous, 0.4–7 cm. long, very scabrous, linear to filiform; bracts of the staminate inflorescence shorter, linear, scabrous; staminate spikelets several-flowered; pistillate spikelets few-several-flowered; scales purple,

acuminate, the staminate ovate-acute, the pistillate ovate-lanceolate, cuspidate, the keel ciliate; hypogynium 3-lobed, the lobes rotund, with a dark-purple margin, entire or sometimes dentate; achene discolored or usually white, 2–3 mm. long, sub-globose, apiculate-verrucose or sub-tuberculate, pubescent, at least on the tubercles. Consists of many races, varying in denseness of inflorescence and size of spikelets.

DISTRIBUTION: Abundant in moist thickets and borders of forests, Mexico and the West Indies to Paraguay and eastern Bolivia.

TABASCO: *J. N. Rovirosa 158;* Achotal, Balancan, *Eizi Matuda 3092.*
CAMPECHE: Villahermosa, *C. L. Lundell 1163.*
PETEN: Tikal National Park, *Lundell 16494.*
BRITISH HONDURAS: *J. B. Kinloch:* Honey Camp, Orange Walk, *Lundell 29, 122, 612;* Swasey Branch, Monkey River, Toledo District, *Percy H. Gentle 3818;* near Honey Camp, *Wm. C. Meyer 105;* All Pines, *W. A. Schipp 683;* Mountain Pine Ridge, El Cayo District, *H. H. Bartlett 11889;* Butcher Burn, Sibun River, Belize District, *Bartlett 11409:* Maskall, Northern River, *Gentle 1014:* Augustine, El Cayo District, *D. R. Hunt 156:* Eve's Pine Ridge, Stann Creek District, *Gentle 8489:* Commerce Bight Pine Ridge, Stann Creek District, *Gentle 8066;* Stann Creek-Sittee Road, Stann Creek District, *Gentle 7896.*

16. SCLERIA CILIATA Michx. Fl. Bor. Am. 2: 167. 1803.

— *Scleria hirtella* Michx. Fl. Bor. Am. 2: 168. 1803; not Sw. Prodr. Veg. Ind. Occ. 19. 1788.
— *Scleria macrantha* Boeck. Flora 41: 647. 1850; not Boeck. Flora 62: 572. 1879 (*fide* Clarke, Symb. Ant. 2: 143. 1900). "Circa New Orleans legit Drummond."
— *Scleria Elliottii* Chapm. Fl. S. U. S. 531. 1860. "Low pine barrens, Florida to North Carolina."
— *Scleria pauciflora* Muhl. var. *Elliottii* Britton, Ann. N. Y. Acad. Sci. 3: 234. 1885. Type locality, "North Carolina to Florida and . . . Texas."
— *Scleria ciliata* var. *Elliottii* Fernald. Rhodora 39: 392. 1937. Based on *S. Elliottii* Chapm.

Rhizome knotted, rather stout; culms 20–60 cm. high, strict, erect, tufted, from rather stout to slender or almost filiform, sharply triangular, hairy, especially on the angles above, or almost glabrous; leaves 20–45 cm. long, 2–6 mm. wide, keeled, linear, obtuse, ciliate on the margins and midrib beneath, often greatly overtopping the culm; sheaths pubescent, especially on the angles; ligule 2 mm. long or less, subrotund; inflorescence terminal and axillary, few-flowered, the clusters sometimes arising from the lower axils near the base on short erect peduncles; bracts elongate, often conspicuously ciliate; bractlets from very long-ciliate to almost glabrous, lanceolate; staminate spikelets many-flowered; scales purple-tinged, lanceolate, pubescent, ciliate on the margins and keel; hypogynium a narrow obtusely 3-angled border supporting three globose, brownish,

entire or 2-lobed tubercles; achene 2–3 mm. long, tuberculate or verrucose-scabrate, white, globose, fragile, usually mucronate-apiculate. Consists of several races differing in pubescence and in the form of the tubercles.

DISTRIBUTION: Sandy soil in thickets and pine barrens, Virginia and Missouri to Texas and Florida, also in the West Indies and Central America.

BRITISH HONDURAS: Cow Pen, near Monkey River, Toledo District, *Percy H. Gentle 4167;* Jenkins Creek, north of Monkey River, Toledo District, *Gentle 4110;* San Agustin, El Cayo District, *C. L. Lundell 6711.*

17. SCLERIA PAUCIFLORA Muhl.; Willd. Sp. Pl. 4: 318. 1806.

Scleria caroliniana Willd. Sp. Pl. 4: 318. "Habitat in sylvis Carolinae."
Scleria pauciflora var. *caroliniana* Wood, Bot. & Flora 368. 1871. Based on *Scleria caroliniana* Willd.
Scleria Oakesiana Robbins; Britton, Ann. N. Y. Acad. Sci. 3: 234, as syn. 1885.
Scleria pauciflora var. *effusa* Clarke, Symb. Ant. 2: 143. 1900. Type locality, Cuba.
Scleria pauciflora var. *kansana* Fernald, Rhodora 8: 165. 1906. Cherokee Co., Kansas, *Hitchcock 864.*
Scleria ciliata var. *pauciflora* Kükenth. Repert. Sp. Nov. 23: 215. 1926. Based on *Scleria pauciflora* Muhl.

Rhizomes 5 mm. or less thick, elongate, hard, nodulose, clustered; culms erect, simple, somewhat scabrous on the angles, triquetrous, 20–50 cm. high, glabrate or hairy (villous in some forms), stiff, usually tufted; leaves 15–20 cm. long, 2 mm. wide or less, rigid, few, glabrate or short-pubescent (villous in some forms), scabrous on the margins, somewhat channeled; sheaths short-pubescent or sometimes villous; ligule short, obtuse, rotund; inflorescence consisting of a few spikelets in a terminal cluster or sometimes 1 or 2 axillary clusters, the lateral remote, on long filiform peduncles; bracts overtopping the culm, erect, ciliate or glabrate (conspicuously fringed in some forms), bractlets ciliate or glabrate; spikelets few-flowered; pistillate scales ovate-lanceolate, acuminate, purplish-tinged, midrib ciliate; hypogynium a narrow triangular border bearing 6 usually finely pulverulent globose tubercles disposed in pairs (in var. *kansana* each set of tubercles consists of 2 large and 1 small); achene 1–2 mm. long, apiculate, white globose, transversely verrucose-papillate, the lower papillae pointed downwards, elongate. Consists of several races, varying mainly in pubescence and number of tubercles.

DISTRIBUTION: Barrens and meadows, New Hampshire to Ohio, Missouri, Kansas, Florida, and Texas, also in Cuba and Central America.

BRITISH HONDURAS: Bakers Pine Ridge, Belize District, *C. L. Lundell 3800.*

18. SCLERIA MUHLENBERGII Steud. Nom. ed. 2. 2: 543. 1841.

"*Scleria setacea*" of Am. authors, not Poir in Lam. Encyc. 7: 4. 1806.
Scleria reticularis Muhl. Descr. Gram. 266. 1817; not Michx. Fl. Bor. Am. 2: 167. 1803. "Habitat in Carolina Septentrionali."
Scleria micrantha Poir. in Lam. Encyc. Suppl. 5: 108. 1817. "Cette plante a été recueillie par M. Ledru a Porto-Rico."
Scleria reticularis Spreng. Syst. 3: 831, in part. 1826. (*fide* Boeck. Linnaea 38: 469. 1874).
Scleria reticularis J. & C. Presl; Presl, Rel. Haenk. 1: 202. 1828.
Scleria laxa Torr. Ann. Lyc. N. Y. 3: 376. 1836; not R. Br. Prodr. 240. 1810.
Scleria oligantha A. Rich. in Sagra, Hist. Cuba 11: 295. 1850.
Scleria Mühlenbergiana Liebm. Vidensk. Selsk. Skr. V. 2: 258. 1850. Variant spelling for *Scleria Mühlenbergii* Steud.
Scleria Torreyana Walp. Ann. 3: 696. 1852. "Habitat in America boreali" (New Jersey, Long Island).
Scleria hemitaphra Steud. Syn. Pl. Cyp. 169. 1855. Type locality, Louisiana (*Drummond*).
Scleria dictyocarpa Wright; Griseb. Cat. Pl. Cub. 249. 1866. "Cuba or. et occ.," *Wright 3416a.*
Scleria bracteata var. *angusta* Griseb. Cat. Pl. Cub. 249, in part. 1866. Type locality, Cuba.
Scleria debilis Wright; Sauv. Anal. Acad. Cienc. Habana 8: 154. 1871. "En sabanas húmedas de Pinar del Rio, Chirigota, Retiro, embarcadero de Bacunagua, &c."
Scleria reticularis var. *pubescens* Britton, Ann. N. Y. Acad. Sci. 3: 232. 1885.
Scleria trichopoda Wright; Britton, Ann. N. Y. Acad. Sci. 3: 232, as syn. 1885.
Scleria setacea var. *hemitaphra* Kükenth. Repert. Sp. Nov. 23: 215. 1926. Based on *Scleria hemitaphra* Steud.
Scleria latilacunosa Kükenth. Bot. Jahrb. 56: Beibl. 125: 21. 1921. "Campo der Serra do Mel, Rio Branco, Surumu," *Ule 8065*, July 1909.

Annual with fibrous roots, or perennial with a very short rhizome; culms very slender, triangular or somewhat compressed, glabrous, tufted, 15–80 cm. tall, weak, diffuse, spreading; leaves 1–4 (rarely –8) mm. wide, flat, glabrous or sparsely hirsute, often with cartilaginous marginal ribs, sometimes scabrous on the margins and nerves beneath; sheaths glabrous or essentially so, sometimes somewhat winged; ligule short, rotund-obtuse, pilose, panicles terminal and axillary, the lateral very remote, on long setaceous-filiform compressed often recurved or drooping peduncles, loosely flowered, clusters 1–3 cm. long; spikelets 2–4 mm. long; bracts glabrous, linear-lanceolate, often exceeding the culm; bractlets glabrous, linear-lanceolate or setaceous; pistillate scales ovate, lanceolate, acuminate, straminous or purplish-tinged with a predominant, green midrib; hypogynium deeply 3-lobed, the lobes ovate-lanceolate, subacute, appressed; achene 2 mm. long, more or less reticulate, the transverse ridges pilose, sordid white, globose-elliptic, umbonate, the ridges somewhat spirally arranged.

DISTRIBUTION: Common in pine barrens and low meadows, New York and Indiana to Florida and Texas, south to the West Indies, Central America, Brazil, and eastern Bolivia.

BRITISH HONDURAS: Swasey Branch, Monkey River, Toledo District, *Percy H. Gentle 3865, 3865A;* Cow Pen, Monkey River, Toledo District, *Gentle 4168, 4042;* Augustine, Mountain Pine Ridge, El Cayo District, *D. R. Hunt 455;* Bakers Pine Ridge, Belize District; *C. L. Lundell 6991* (in part); Bakers Pine Ridge, Belize District, *Lundell 7026;* Belize-Cayo Road, Belize District, *Gentle 9514.*

19. SCLERIA MELALEUCA Reichb.; Schlecht. & Cham. Linnaea 6: 29. 1831.

Scleria communis Liebm. Vidensk. Selsk. Skr. V. 2: 71, in part. 1850. (*fide* Clarke, Symb. Ant. 2: 146. 1900).
Scleria pratensis var. *melanocarpa* Boeck. Vidensk. Meddel. 1869: 153. 1870. "Ad Lagoa Santa cum forma typica."
Scleria pratensis var. *mucronata* Boeck. ms. (*fide* Clarke, Symb. Ant. 2: 146. 1900.
Scleria pterota var. *melaleuca* (Reichb.) Standley, Field Mus. Pub. Bot. 18: 106. 1937.

Rhizome horizontal, nodose, 4–8 mm. thick; culms 30–90 cm. tall, sharply triquetrous, essentially glabrous, the angles scabrous; leaves 20–30 cm. long, 3–10 mm. wide, scabrous, flat, 3-nerved, obtuse, glabrous; sheaths narrowly 3-winged, glabrous, wings scabrous; ligule up to 1 cm. long, pilose or glabrous, ovate-lanceolate; inflorescence terminal and axillary, of 1–4 panicles, the lower pedunculate, simple or nearly so, the branches few-flowered, the rachis very scabrous on the angles, usually conspicuously deep-purple when mature; lower bract of the inflorescence leaf-like; bractlets lanceolate-subulate, scabrous, ciliate, green-purple; staminate scales lanceolate, red-brown; pistillate scales broadly ovate-orbicular, abruptly acuminate, deep-purple; hypogynium depressed, 3-lobed, the lobes broad, rotund, dark-brown, the margin paler; achene 2 mm. long, smooth, shining, sometimes hairy near the base, mucronate, elliptic-globose, purplish-tinged to black (or white at the base). — A handsome species, the purple inflorescence forming a pretty contrast to the deep-green foliage. This may be only a color variant of *S. pterota.* The amount of shade seems to influence the color.

DISTRIBUTION: Common on wet grassy plains and on banks along shaded streams, West Indies to Brazil, eastern Bolivia and the Galapagos Islands.

TABASCO: La Palma, Balancan, *Eizi Matuda 3326.*
CAMPECHE: Tuxpeña, *C. L. Lundell 1100.*
PETEN: Rio Cancuen, *Julian S. Steyermark 46003, 46005;* Sabana San Francisco, La Libertad, *Lundell 2547;* La Libertad, *Lundell 3725;* La Libertad-Flores Road, *Lundell 3977;* La Libertad, *M. Aguilar H. 62;* Tikal National Park, *Lundell 16187.*

BRITISH HONDURAS: *J. B. Kinloch 241;* Swasey Branch, Monkey River, Toledo District, *Percy H. Gentle 3770;* near Honey Camp, Northern District, *F. Egler 42–136;* Honey Camp, *Lundell 542;* near Vaca, El Cayo District, *Gentle 2565;* Prospecto; Northern District, *Gentle 919;* Sibun River, south of Belize, *Hugh O' Neill 8890;* Big Creek, *W. A. Schipp 891;* San Antonio, El Cayo District, *H. H. Bartlett 13043;* Chalillo Crossing, El Cayo District, *Lundell 6506;* Monkey River, Toledo District, *Gentle 3576;* Edwards Road beyond Columbia, Toledo District, *Gentle 6539.*

20. SCLERIA PTEROTA Presl, Isis 21: 268. 1826.

Schoenus latifolius Vahl. Enum. 2: 226. 1806 (*fide* Kunth, Enum. Pl. 2: 338. 1837).
Scleria latifolia Sieber; Presl, Isis 21: 268. 1828 (*fide* Boeck. Linnaea 38: 482. 1874).
Scleria asperata Presl, Isis 21: 268. 1828.
Scleria margaritifera Presl. Isis 21: 268. 1828 (*fide* Boeck. Linnaea 38: 482. 1874.
Dichromena Vahlii Dietr. Sp. Pl. 2: 169. 1833 (*fide* Clarke, Symb. Ant. 2: 147. 1900).
Scleria affinis Presl; Steud. Nomencl. ed. 2. 2: 542. 1841.
Scleria communis Kunth, Enum. Pl. 2: 340, pro parva parte. 1837 (*fide* Clarke, Symb. Ant. 2: 146. 1900). "Brasilia, Bahia, Martinica, Jamaica, et ?Nova Hollandia (an patria a Sieb. recte notata?)."
Scleria Selloana Schrad.; Nees, in Mart. Fl. Bras. 2(1): 179, as syn. 1842.
Scleria conspersa Sellow; Nees, in Mart. Fl. Bras. 2(1): 179. 1842.
Scleria pratensis Lindl.: Nees, Nova Acta Acad. Leop. Carol. 19: Suppl. 1: 121. 1843.
Scleria simplicior Steud. Syn. Pl. Cyp. 169. 1855. "Rengger legit in Paraguay."
Scleria ottonis Boeck. Linnaea 38: 490. 1874. Type locality, Cuba (*Otto 299*).
Scleria flagellata Sw.; Boeck. Linnaea 38: 506, as syn. 1874.
Scleria Pittieri Boeck.; Tonduz, Bull. Herb. Boiss. 3: 7, nomen. 1895. Allg. Bot. Zeitschr. 2: 159. 1896. "In Costarica leg. H. Pittier."
Scleria boliviana Palla; Buchtein, Contrib. Fl. Boliv. 1: 90, name only. 1910.

Rhizome thick, nodose, elongate, usually purplish-brown; culms 0.5–3 m. high, rather slender, erect, glabrous, sharply triangular, slightly rough on the angles; leaves 14–45 cm. long, 5–15 mm. wide, obtuse, glabrous, margin scabrous; sheaths narrowly 3-winged; ligule 4–10 mm. long, ovate-triangular, margin cartilaginous, pilose; inflorescence green or yellow-brown, sometimes purplish-tinged, the panicles 3 or 4, axillary and terminal, the rachis minutely pubescent or glabrate, triquetrous; panicles pyramidal, 5–15 cm. high; bracteal leaf foliaceous, equaling the stem; bractlets filiform, setaceous-capillary; spikelets greenish-brown or purplish-tinged; staminate scales lanceolate, acuminate; pistillate scales ovate-orbicular, abruptly acuminate, the tip frequently recurved, usually straw-colored, sometimes purplish-tinged; hypogynium depressed, 3-lobed, the lobes broad, rounded, ciliate or glabrous; achene 1.5–2.5 mm. long, smooth, white or yellow-brown, depressed-globose or sometimes pointed, apex subumbonate.

DISTRIBUTION: Common in boggy meadows and wet clearings from the West Indies and Central America to eastern Bolivia, Paraguay, northern Argentina, and the Galapagos Islands.

PETEN: Dolores, *Elias Contreras 2490;* Remate, *Contreras 888.*
BRITISH HONDURAS: Near Honey Camp, *Wm. C. Meyer 133;* Corozal-Pachacan Road, *Percy H. Gentle 100;* Corozal-Pachacan Road, *C. L. Lundell 4915;* Northwest of Maskall Bank, *Hugh O'Neill 8908;* near Jacinto Creek, Stann Creek District, *Gentle 5561.*

21. SCLERIA SECANS (L.) Urban Symb. Ant. 2: 169. 1900.

Schoenus secans L. Syst. ed. 2: 865, excl. syn. Rumpf. 1759.
Carex lithosperma L. Syst. ed. 12. 618, in part. 1767 (*fide* Sw. Fl. Ind. Occ. 1: 88. 1797).
Schoenus lithospermus L. Sp. Pl. ed. 2. 1: 65, in part. 1762. (*fide* Sw. Ind. Fl. Occ. 1: 88. 1797).
Scleria scabra Willd. Sp. Pl. 4: 315. 1805.
Arundo farcta Aubl. Pl. Guian. 1: 52. 1775 (*fide* Poir. in Lam. Encyc. 7: 1. 1806).
Scleria reflexa HBK. Nov. Gen. & Sp. 1: 232. 1816. "Crescit locis planis humidis Novae Andalusiae prope Cumana et Bordones."
Scleria caricifolia Schrad.; Nees, in Mart. Fl. Bras. 2(1): 177, as syn. 1842.
Mastigoscleria reflexa Nees, in Mart. Fl. Bras. 2(1): 177. 1842. Based on *Scleria reflexa* HBK.
Scleria Renggeriana Steud. Syn. Pl. Cyp. 173. 1855. Type locality, Paraguay.
Scleria Weigeltiana Schrad.; Boeck. Linnaea 38: 504, as syn. 1874.
Scleria porphyrorhiza Wright; Sauv. Anal. Acad. Cienc. Habana 8: 155. 1871. "En los pinares de la Vuelta de Abajo, cerca de Pinar del Rio," *Wright.*
Scleria lobulata Palla, Denks. Akad. Wien 79: 197. 1908. Type locality, Campinas, Brazil, *Campos Novaes 1324.*

Rhizome perennial; culms 3–10 m. long or longer, spreading or high-climbing, sharply triquetrous, angles roughened or very scabrous; leaves 2–5 mm. wide, linear, elongate, acuminate, the midrib and margins scabrous, glabrous or usually pubescent above near the base, sometimes pilose beneath; sheaths retrorsely scabrous, pubescent towards the apex; ligule usually conspicuously scarious-appendaged, rotund-ovate, glabrous, dark-brown, the margin irregular, lacerate; inflorescence terminal and axillary in the upper leaves, the peduncles villous on the angles, loosely branched; bracts foliaceous; bractlets capillary-setaceous, villous; spikelets reflexed; pistillate scales ovate, acute, glabrous, very dark-purple to black; hypogynium flat, sub-orbicular, subentire, the margin reflexed, undulate; achene 2–4 mm. long, globose-ovoid, white, smooth, shining, usually minutely white-pubescent, as long as the scales or nearly so. *S. scabra* Willd. resembles this species so closely that it may be regarded as only a form.

DISTRIBUTION: Wet thickets and savannas, West Indies and Mexico to eastern Bolivia and Paraguay.

PETEN: La Libertad, *M. Aguilar H. 308.*
BRITISH HONDURAS: *J. B. Kinloch 246;* Honey Camp, *C. L. Lundell 569;* Monkey River, Jenkins Creek, Toledo District, *Percy H. Gentle 4161;* Maskall, *Gentle 912;* Maskall Bank, *Hugh O'Neill 8907;* near Columbia, Toledo District, *Gentle 7067;* Punta Gorda-Cero Road, Toledo District, *Gentle 6831;* near Condemn Branch Creek, Toledo District, *Gentle 5555.*

VOLUME 3 MAY, 1966 NUMBER 8

WRIGHTIA

A BOTANICAL JOURNAL

CONTENTS

Studies of Tropical American Plants—III.
By Cyrus Longworth Lundell 161

The Mexican and Central American Species of Dichapetalum.
By Cyrus Longworth Lundell 173

A Method for Applying Mystox (Lauryl Pentachlorphenate) to Protect Mounted Herbarium Specimens.
By Cyrus Longworth Lundell and Richard Kirkham 177

A New Pinyon Variety from Texas.
By Elbert L. Little, Jr. 181

Two New Plants in Texas.
By Donovan S. Correll 188

Studies of the American Myrsinaceae—III.
By Cyrus Longworth Lundell 192

PUBLISHED BY
TEXAS RESEARCH FOUNDATION
RENNER, TEXAS

E 10

MISSOURI BOTANICAL

JUL 5 - 1966

GARDEN LIBRARY

WRIGHTIA

WRIGHTIA, a botanical journal, is a publication of Texas Research Foundation. The contributions are by staff members and collaborators.

Each volume will contain a series of numbers, to be issued at irregular intervals. The subscription price for Volume 3 is $12.00, postpaid.

VOLUME 3, NUMBER 8
ISSUED MAY 31, 1966

Printed in the U.S.A.
Cayuga Press, Inc.
Ithaca, New York

WRIGHTIA

VOLUME 3 MAY, 1966 NUMBER 8

STUDIES OF TROPICAL AMERICAN PLANTS—III

CYRUS LONGWORTH LUNDELL

In the identification of accumulated collections, particularly from the Maya Area, additions to the flora are to be expected in almost every family. In this continuation of my studies, the Smilacaceae, Moraceae, Capparidaceae, Guttiferae and Caprifoliaceae have yielded some noteworthy new records and several species which appear to be novelties. A species of *Anthurium* is described from Tikal, and extensions of range into Mexico of several Myrsinaceae are included.

It is of interest that the presence or absence of hairs on the style, the nature of the pubescence of the young stems and leaves, and the leaf form provide specific characteristics for distinguishing the species of *Viburnum*. My treatment of the genus *Parathesis* of the Myrsinaceae is based largely on similar minor yet significant vegetative differences.

Anthurium tikalense Lundell, sp. nov. (Fig. 55)—Planta grandis, epiphytica vel terrestris, caudice brevi crasso; petioli crassi, quadrangulati, sulcati, usque ad 25 cm. longi, 2 cm. diam., ad apicem geniculati; lamina subcoriacea, oblanceolata vel lanceolato-elliptica, usque ad 1.75 m. longa, 45 cm. lata, apice acuta vel acuminata, basi acuta, obtusa vel rotundata, integra, crassinervia, 7–20-nervia, costa subtus crassa; pedunculus usque ad 45 cm. longus teres; spatha lanceolata vel lanceolato-linearis, usque ad 18 cm. longa prope basin usque ad 5.5 cm. lata; spadix usque ad 30 cm. longus, 5 cm. crassus; baccae rubrae, oblongae, usque ad 2 cm. longae; semina oblongo-elliptica, 5–5.5 mm. longa, minute verrucosa.

GUATEMALA: Dept. Peten, Tikal National Park, Tikal, on temple in Group "H", March 1, 1961, *C. L. Lundell 18198* (LL, type), juvenile plant collected at Tikal and grown to maturity in greenhouse at Renner, "*hoja de piedra.*"

Abundant on shaded tree trunks and rocks, particularly on temple ruins, this rosulate species is one of the most distinctive plants at Tikal. Locally it is used to line walkways, and planted with shrubbery around buildings where the thriving plants sometimes reach a height of over two meters.

Fig. 55. *Anthurium tikalense* Lundell, growing on ruins at Tikal; note the six-sided petioles.

The midrib of the leaf is elevated and triangular on upper surface, quadrangular beneath from one-third to two-thirds its length, with the apical part of midrib rounded. The quadrangular geniculum, at the base of blade, is smooth or slightly grooved above. Usually the stout petiole is quadrangular and sulcate, with sharp angles above, flattened angles beneath. The flattened angles are up to 4 mm. wide, and sometimes give the petiole a six-sided aspect.

In young plants a year or so old, the leaves have few veins, usually 7 to 10 pairs, but at maturity, old plants have leaves with up to 20 pairs of prominent veins elevated on both surfaces.

The spadix reaches a length of 30 cm. and a diameter of 5 cm., but smaller ones predominate. Juvenile plants in flower have a spadix less than 3 cm. long!

The mature spadix with its protruded cherry red berries is striking.

A. tikalense is perhaps the species currently reported from the region as *A. tetragonum* Hooker ex Schott. Described from a sterile specimen of unknown origin, the application of the name *A. tetragonum* is doubtful.

Smilax caudata Lundell, sp. nov.—Caules graciles, subteretes, laeves, glabri; folia petiolis 7–10 mm. longis stipitata; lamina lanceolata, 8–15

cm. longa, 2–5.2 cm. lata, apice attenuato-cuspidata, basi rotundata vel subtruncata et acutiuscula, glabra, membranacea vel subchartacea, integra, 5-nervia, utrinque reticulata; flores ignoti; pedunculus fructiferus 1–2 mm. longus, petiolo multo brevior; receptaculum globosum, ca. 3.5 mm. diametro, pauciflorum; pedicelli fructiferi gracillimi, 8–10 mm. longi, basi bulboso-inflati; baccae rubrae, globosae, 6–10 mm. diametro.

GUATEMALA: Alta Verapaz, on Sebol-Coban Road, between km. 285/286, between Chiracte and Chapultepec Farm, in high forest, May 24, 1964, *Elias Contreras 4783* (LL, type), vine, fruit reddish.

Flowers are unknown, but perianth segments persistent at the base of the fruits are lanceolate, 4–5 mm. long, and the three subulate staminodia are about 1.5 mm. long. The leaves are broadest at or near the base, and taper apically into a long conspicuous acute cusp. These characteristics combined with thin leaves finely veined on both surfaces, midvein impressed above, fruiting peduncles not over 2 mm. long, slender pedicels somewhat bulbous at base, and red fruits well-mark the species. Its relationship appears to be with *S. domingensis* Willd. (*S. lanceolata* L.), which has entirely different leaves.

SMILAX ENGLERIANA Apt., Repert. Sp. Nov. Fedde 18: 407. 1922.

GUATEMALA: Dept. Peten, Dolores, in savanna, about 2 km. 500 m. east of village, Sept. 11, 1961, *Elias Contreras 2883* (LL), vine, young berries green.

From Morton and Killip's description (Carnegie Inst. Wash. Publ. 461: 266. 1936), this collection appears to be referable to *S. Engleriana*, a species known heretofore only from Costa Rica. The Peten plant has subulate receptacle bracts up to 3 mm. long.

Smilax Gentlei Lundell, sp. nov.—Caules teretes, inermes, graciles, novelli rufo-tomentosi, demum glabrescentes; petioli usque ad 1.5 cm. longi, rufo-tomentosi; lamina foliorum oblongo-lanceolata vel oblonga, 5–13 cm. longa, 1.7–5.5 cm. lata, apice acuminata, basi cordata vel subcordata, integra, inermis, chartacea, glabrescens, triplinervia, 5–7-nervia, utrinque minute reticulata; flores ignoti; pedunculi fructiferi 0.7–2 cm. longi, rufo-tomentosi; receptaculum globosum, rufo-tomentosum; pedicelli 5–6 mm. longi, rufo-pubescentes; baccae rubrae, subglobosae, 5–7 mm. diametro.

BRITISH HONDURAS: Toledo District, Feeders Road, 14 Miles, San Antonio-Punta Gorda Road, in broken cohune ridge, April 27, 1949, *Percy H. Gentle 6726* (LL), vine, "*cat tongue sarsaparilla*"; between Orange Point and Moho River, in broken cohune ridge, April 12, 1952, *Gentle 7648* (LL, type), vine, berries red.

Perianth segments persisting at the base of fruits in *Gentle 6726* are oblongish, 3–4 mm. long, and have a few subappressed hairs dorsally. There are three short subulate staminodia. The leaves have persistent long subappressed reddish hairs along the principal veins on undersurface.

S. Gentlei appears to have close affinity to the *S. mollis* Humb. & Bonpl. group, but differs at once in the triplinerved leaves. All the leaves in *S. mollis* arise from the leaf base. Its reddish indument is distinctive, particularly the rather coarse long hairs which measure up to a millimeter in length.

SMILAX LUNDELLII Killip & Morton, Carnegie Inst. Wash. Publ. 461: 265. 1936.

BRITISH HONDURAS: Toledo District, near Mafridvle Lagoon, in *acahual*, June 9, 1952, *Percy H. Gentle 7722* (LL), vine, (staminate) flowers creamish colored, "*dog tongue sarsaparilla.*"

The species is seldom collected and apparently rare. I have encountered it only once.

SMILAX PURPUSII Brandeg., Univ. Calif. Publ. Bot. 6: 177. 1915.

MEXICO: Chiapas, Fraylesca, near Siltepec, in an open sunny place in pineland, March 13, 1945, *Eizi Matuda 5258* (LL); Carelas, near Motozintla, in secondary growth, alt. 2176 m., April, 1945, *Matuda 5508* (LL).

Both collections are staminate with flowers 5–6 mm. long borne on slender pedicels up to 1.3 cm. long. The filaments are 3–4 mm. long, and the anthers 1–2 mm. and recurved. The species closely resembles *S. subpubescens* A.DC. and *S. rufa* Lundell.

SMILAX RUFA Lundell, Contr. Univ. Mich. Herb. 7: 4. 1942; Morton, in Brittonia 14: 302. 1962.

MEXICO: Chiapas, Mt. Male, near Porvenir, alt. 3200 m., July 6, 1941, *Eizi Matuda 4591* (LL, isotype), a vine; San Luis, near Siltepec, alt. 1300 m., June 20, 1945, *Matuda 5982* (LL).

A collection with staminate flowers, *Matuda 5982*, has the same fine reddish tomentum as the type. In the isotype cited, a pistillate flower at anthesis persists, and there are definitely three subulate staminodia. The species appears to be amply distinct from *S. subpubescens* A.DC.

SMILAX SUBPUBESCENS A.DC., Monogr. Phan. 1: 69. 1878; Killip and Morton, Carnegie Inst. Wash. Publ. 461: 281. 1936.

GUATEMALA: Dept. Quiche, Nebaj, in low forest about 6 km. west, alt. about 7000 ft., June 18, 1964, *Elias Contreras 5046* (LL), vine, fruit subglobose, orange (6

staminodia persistent at base of some fruits); Nebaj, in low forest, 7 km. 500 m. sw.w., alt. about 7000 ft., June 22, 1964, *Contreras 5092* (LL), vine (6 staminodia persistent at base of some young fruits); Nebaj, on chunama, in low forest about 13 km. n., on Cotzal Road, alt. 6000 ft., *Contreras 5141* (LL), vine, staminate flowers green, "*cocolmeca*"; Nebaj, on chunama, low forest about 13 km. n. on Cotzal Road, alt. 6000 ft., July 1, 1964, *Contreras 5143* (LL), *5146* (LL), vine, pistillate flowers green (staminodia 3), "*cocolmcca.*"

These Guatemalan collections all appear to be referable to *S. subpubescens* as currently interpreted. *Contreras 5046*, in fruit, closely matches the photograph of the type! The leaves are glabrescent early. The number of staminodia is variable in the collections cited. Some collections have three, others six. I see no other significant differences between those with three and those with six staminodia, so the species apparently has either three or six.

Smilax venosa Lundell, sp. nov. (Fig. 56)—Caules inermes novelli fulvo-tomentosi, demum glabrescentes; petioli fulvo-tomentosi, crassiusculi, 1.3–4.5 cm. longi; lamina foliorum ovata vel late cordata, 8.5–22 cm. longa, 5–17 cm. lata, apice acuminata, basi cordata, subcordata vel rotundata, coriacea, integra, supra juventute subtomentosa, mox glabrescens, subtus fulvo-tomentosa, 7–9-nervia, crassinervia, utrinque reticulata; pedunculi masc. usque ad 2 cm. longi, tomentosi; pedicelli usque ad 1.2 cm. longi, tomentosi; flores masc. numerosi, tomentosi, perianthii segmentis oblongis, usque ad 5.5 mm. longis; filamenta ca. 3 mm. longa; antherae ca. 2 mm. longae; pedunculi fem. crassi, usque ad 5 cm. longi, fulvo-tomentosi; pedicelli usque ad 1.7 cm. longi, fulvo-tomentosi; flores fem. numerosi, novelli tomentosi, mox glabrati, perianthii segmentis oblongis, ca. 4 mm. longis; staminodia 3, subulata, ca. 1 mm. longa; stigma 3-lobata, ca. 1 mm. longa.

MEXICO: Chiapas, Pinabeto, near Motozintla, alt. 2585 m., in advanced forest, May 7, 1945, *Eizi Matuda 5426* (LL, type), pistillate flowers; Pinabeto, near Motozintla, alt. 2585 m., July 8, 1945, *Matuda 5442* (LL), staminate flowers.

S. venosa is a very robust species, with zigzag rather slender terminal stems which are obscurely and obtusely quadrangular. The lower glabrescent stems are essentially terete. The large leaves have conspicuous veins on both surface, the principal ones drying angulate on lower surface. Noteworthy are the stout flattened peduncles, large umbels with numerous flowers on long very slender pedicels which are persistently tomentose. The perianth is glabrescent early.

The species is very near *S. subpubescens* A.DC., as that taxon is currently being interpreted. The veins of leaves angulate beneath, the persistent fulvous tomentum of all parts, and the stout flattened peduncles up to

Fig. 56. *Smilax venosa* Lundell, type specimen, *Eizi Matuda 5426* (LL), × ⅓.

5 cm. long are among the characteristics distinguishing the species from *S. subpubescens.*

I have some reservation as to the application of the name *S. subpubescens* to the populations now being referred to this taxon. I base this on the original description by De Candolle and the type photograph of the species.

Brosimum belizense Lundell, sp. nov.—Arbor; ramuli crassiusculi, novelli minute puberuli; folia petiolis 6–15 mm. longis stipitata; lamina

subcoriacea, utrinque reticulata, glabra, lanceolata vel oblongo-lanceolata, 10–20 cm. longa, 3.7–6.5 cm. lata, apice obtuse acuminata, basi rotundata vel acutiuscula; nervis lateralibus 14–20-jugis; stipulis lateralibus 3–5 mm. longis; flores dioeci; fructus globosi ca. 1.3 cm. diam.

BRITISH HONDURAS: Belize District, Gracie Rock, Sibun River, in *acahual*, Sept. 6, 1935, *Percy H. Gentle 1737* (LL, type), tree, 10 in. diam.

The narrow leaf blades are broadest at or below the middle, inaequilateral at base, and have fine but conspicuous reticulation on both surfaces. The peduncles of the 1–2-seeded fruits are finely puberulent and about 3 mm. long. In its leaf features, short peduncles and small fruits, *B. belizense* appears to be distinct from *B. Ojoche* Woodson, to which it evidently has affinity.

Brosimum Gentlei Lundell, sp. nov.—Arbor; ramuli graciles, novelli minute puberuli; folia petiolis 3.5–6 mm. longis stipitata; lamina glabra, membranacea, oblongo-elliptica vel late lanceolato-elliptica, 9.5–22.5 cm. longa, 4–11 cm. lata, apice subabrupte caudato-acuminata, basi rotundata et emarginata, minute subauriculata, nervis lateralibus 14–22-jugis; stipulis amplexicaulibus acuminatis usque ad 1.3 cm. longis cicatrice ramulum transverse cingenti; flores dioici; fructus globosi ultra 1.5 cm. diam.

BRITISH HONDURAS: Toledo District, along creek, Moffredye Creek near San Antonio, April 3, 1945, *Percy H. Gentle 5314* (LL, type), large tree.

This is a very distinct dioecious species of *Brosimum*, notable for its large thin leaves which are emarginate and minutely subauriculate at base, and cuspidate at apex. The lobes of the subauriculate base, when present, are callosed. The short petioles and sericeous stipules further serve to distinguish the taxon. Peduncles of the pistillate receptacles are shorter than the receptacles. The pistillate flowers vary from several to numerous, but only one usually develops. The fruits are 1–3-seeded, and the slender persistent styles, bifid apically, are up to 1 cm. long.

B. Gentlei is apparently related to *B. terrabanum* Pittier, a species immediately recognized by its much longer petioles and peduncles.

Ficus petenensis Lundell, sp. nov.—Arbor, 25 m. alta, glabra; stipulae usque ad 2 cm. longae, glabrae; petioli 5–15 mm. longi; lamina membranacea, glabra, oblanceolata vel anguste oblanceolata, 6.5–15 cm. longa, 1.7–5 cm. lata, apice subabrupte tenuicaudata, basi cuneata, nervis lateralibus 8–15-jugis; receptacula solitaria, sessilia vel subsessilia, subglobosa, glabra, ostiolo parvo, ca. 1 mm. diam.

GUATEMALA: Dept. Peten, Dolores, in high forest on Rio Mopan trail, about 2 km. 750 m. southeast of the village, June 24, 1961, *Elias Contreras 2521* (LL, type), tree, 40 in. diam., 80 ft. high, immature fig green, "*higo.*"

Referable to the subgenus Pharmacosyce, *F. petenensis* is strikingly unlike any other species of the region. It has very slender needle-like stipules, thin pale green leaves with slender veins, cuspidate leaf blades with cusps up to 3 cm. long, and sessile glabrous receptacles with minute ostiole.

Forchhammeria laxiflora Lundell, sp. nov.—Frutex, 1 m.; ramuli glabri, crassiusculi; folia 3-foliolata, glabra; petioli 7.5–15 cm. longi; lamina glabra, pallida, coriacea vel subcoriacea, oblongo-obovata vel obovato-elliptica, 8.5–20 cm. longa, 3.5–7 cm. lata, apice rotundata et late acuta, basi acuta; inflorescentia magna, glabra, laxa, late paniculata, usque ad 40 cm. longa, 32 cm. lata; pedicelli 3–15 mm. longi; fructus immaturus usque ad 1 cm. diam.

GUATEMALA: Dept. Peten, Tikal National Park, in *ramonal* on Dos Aguadas trail, Feb. 20, 1959, *C. L. Lundell 15685* (LL, type), shrub, 3 ft. high.

The large lax slender panicles are borne on old wood with peduncles up to 12 cm. long. The three leaflets have short thick canaliculate petiolules 2.5 to 4 mm. long. Although the leaflets are similar to those of *F. trifoliata* Radlk., they are typically broadest at the apex and subtruncate-rounded. The acute apex is abruptly triangular.

Although the flowers of the genus are supposedly dioecious, no plants of *F. trifoliata* have been found with staminate inflorescences. As in *F. trifoliata*, stamens persist at the base of the young fruits in *F. laxiflora*. In *F. laxiflora* these stamens are about 4 mm. long, with small basifixed cordate anthers about 0.5 mm. long. The flowers appear to be perfect.

F. laxiflora belongs to the subgenus Helandra, with affinity to *F. trifoliata* and *F. Matudae* Lundell. Both of these species have narrow racemiform inflorescences, and *F. Matudae* differs strikingly in leaf form.

FORCHHAMMERIA MATUDAE Lundell, Lloydia 2: 87. 1939.

MEXICO: Guerrero, Distr. Montes de Oca, San Antonio-Montes del Balsamo, mountain slopes, April 13, 1938, *Geo. B. Hinton 14002* (LL), tree, 6 m. high.

Apparently this is the first record for the tree in central Mexico. Described from Chiapas, the species ranges southward into Guatemala.

At the insistence of the collector, all species which I named for Eizi Matuda were designated "*Matudai.*" The correct form, "*Matudae,*" is now being applied.

Clusia Pringlei Lundell, sp. nov.—Arbor parva, 8 m. alta, glabra, ramulis crassis; petioli crassi, 6–15 mm. longi, late marginati; lamina oblanceolata vel obovata, 7.5–15 cm. longa, 3.5–9.5 cm. lata, apice late rotundata, basi acuta, coriacea, costa crassiuscula, nervis lateralibus utroque latere 20–30, anglo acuto adscendentibus; inflorescentiae terminales, pauciflorae, 1–2.5 cm. longe pedunculatae, pedunculis crassis, floribus subsessilibus; bracteae 2, latae ovatae vel rotundatae; sepala 4, late rotundata, 5–8 mm. longa; petala 5, obovata vel oblanceolata, usque ad 2 cm. longa, 1.3 cm. lata; stamina numerosa, 1–1.3 cm. longa; filamenta libera, crassa; antherae crassae, 3.5–4 mm. longae.

MEXICO: Michoacan, Uruapan, lava fields, Oct. 16, 1904, *C. G. Pringle 8799* (LL, type).

Evidently this is the rather common species of western Mexico which has been confused with *C. Salvinii* Donn. Sm. of Guatemala. It may be separated at once by the stamen characteristics. In *C. Pringlei* the anthers are shorter than the filaments, while in *C. Salvinii* they are three times as long as the filaments.

GENTLEA MICRANTHA (Donn. Sm.) Lundell, Wrightia 3: 107. 1964.

MEXICO: Chiapas, Municipio of Tenejapa, steep slopes near summit of trail to Pokolum just outside of Tenejapa Center, elev. 7500 ft., Aug. 6, 1964, *D. E. Breedlove 6948* (F, LL), shrub, 15 ft.; Municipio of Santa Eulalia, on slope with *Pinus*, *Quercus* and *Drimys*, 6 miles north of Santa Eulalia along road to San Mateo Ixtatan, elev. 9200 ft., Feb. 5, 1965, *Breedlove 8589* (F), flowers white, tree 25 ft. tall; Municipio of Pueblo Nuevo Solistahuacan, cloud forest on ridge north of Clinica Yerba Buena near Pueblo Nuevo Solistahuacan, elev. 6500 ft., Jan. 25, 1965, *Peter H. Raven & D. E. Breedlove 19986* (F), *20018* (F), shrub 8–10 ft. tall, flowers pink.

These are the first records of the species for Mexico. The leaves of *Breedlove 6948* are small, ranging from 3 to 8 cm. in length, and from 2 to 3.8 cm. in width, but this is to be expected at high altitudes.

GENTLEA VENOSISSIMA (Ruiz & Pavon) Lundell, Wrightia 3: 103. 1964.

MEXICO: Chiapas, Municipio of Carranza, slope with *Quercus*, along the road to Pinola, 2 km. sw. of Aguacatenango, elev. 5600 ft., Dec. 18, 1964, *D. E. Breedlove 7952* (LL), shrub 5 ft. tall.

The species, rather common in Guatemala, has not been recorded before from Mexico.

PARATHESIS VULGATA Lundell, Wrightia 3: 88. 1963.

MEXICO: Chiapas, Municipio Pueblo Nuevo Solistahuacan, cloud forest on ridge, north of Clinica Yerba Buena near Pueblo Nuevo Solistahuacan, elev. 6500 ft., Jan. 25, 1965, *Peter H. Raven & D. E. Breedlove 19984* (F), shrub 10 ft. tall.

A fruiting specimen, this collection appears to be referable to *P. vulgata*. It is the first collection of the species in Mexico.

Viburnum amatenangense Lundell, sp. nov.—Ramuli hirsuti; petioli hirsuti, canaliculati, 3–7 mm. longi; laminae foliorum ovatae, ovali-ovatae, ellipticae vel lanceolatae, 3.5–7 cm. longae, 2.2–4.3 cm. latae, chartaceae, bullatae, apice acutae vel subacuminatae, basi rotundatae vel subcordatae, integrae, vel dentibus glandulosis paucis basi instructae, subtus nervis mediis adpresse hirsutae, venis lateralibus hirsutulae; pedunculi hirsuti, 1.5–3 cm. longi; cymae radii hirsuti, pauci glandulosi; bracteolae lineares, hirsutae, ciliatae; calycis tubus 1.2–1.5 mm. longus, basi glandulosus et hirsutis; calycis lobi deltoidei, ca. 0.4–0.5 mm. longi, ciliati, glabri; corolla glabra, ca. 3 mm. longa; stamina exserta; stylus glaber.

MEXICO: Chiapas, Amatenango del Valle, riverside, alt. 1835 m., June 12, 1945, *Eizi Matuda 5854* (LL, type), small tree, 2–3 m. high.

In the Section Mexicana, to which *V. amatenangense* is referred, the species appears to be nearest *V. lautum* Morton, differing at once in having a calyx tube glandular and appressed hirsute below, and in its larger bullate leaves. A few mostly simple hairs persist on the upper surface of mature leaves and finer pubescence along the costa and veins. The 4 to 6 primary veins are strongly impressed above. The undersurface of the blade is conspicuously paler with the veins conspicuous. The deltoid calyx lobes are minute, much smaller than in *V. lautum*.

VIBURNUM MENDAX Morton, Proc. Biol. Soc. Wash. 49: 154. 1936.

GUATEMALA: Dept. Quiche, Nebaj, bordering Arroyo de la Presa, in clearing about 300 meters ne., June 5, 1964, *Elias Contreras 4872* (LL), shrub, corolla white; June 17, 1964, *Contreras 5030* (LL), shrub, 7 ft., corolla white; Nebaj, alt. c. 6000 ft., June 26, 1964, *George R. Proctor 24929* (LL), shrub 4 m. high, flowers white, scented.

The collections are from the type locality!

Viburnum Molinae Lundell, sp. nov.—Ramuli stellato-puberuli et hirsuti; petioli stellato-puberuli et subadpresse hirsuti, 5–10 mm. longi; laminae ovatae vel lanceolatae, 4.5–9 cm. longae, 1.8–4.5 cm. latae, coriaceae, integrae, ciliatae, apice acutae vel acuminatae, basi glandulosae, acutae, obtusae et rotundatae, supra glabrae (venis exceptis), subtus venis adpresse hirsutae; pedunculi stellato-puberuli, 3–4.5 cm. longi; cymae radii stellato-puberuli; bracteae deciduae; calycis tubus ca. 1 mm. longus, basi densissime albido-tomentosus, apice glaber, eglandulosus; calycis lobi glabri, ciliati; corolla 3 mm. longa, glabra; stamina ca. 4.5 mm. longa; stylus albo-pubescens.

HONDURAS: Dept. Cortes, Cordillera de Idalfonso, bosque lluvioso de Montaña de Cusuco, alt. 1500–2000 m., May 26, 1956, *Antonio Molina R. 7279* (LL, type), fls. blancas, arbol 2–5 m.

A very distinct species of the Section Optata, *V. Molinae* has coriaceous leaves with long appressed hairs on the veins beneath. The stellate pubescent branchlets and inflorescence, and the white tomentose basal half of the calyx tube immediately distinguish it from *V. optatum* Morton of Guatemala.

Viburnum siltepecanum Lundell, sp. nov.—Rami angulati; ramuli graciles, minute stellato-hirsuti; petioli glabrati, 5–7 mm. longi; lamina chartacea vel subcoriacea, lanceolata vel elliptica, 3–7 cm. longa, 1.3–4 cm. lata, apice acuminata, basi acuta, obtusa vel rotundata, glandulosa, integra vel paucidentata, parce ciliata, supra glabra (venis exceptis), subtus pallidior, glabra (venis axillis exceptis); pedunculi pauciglandulosi, minute hirsuti, glabrati, 1–3.5 cm. longi; cyrmae radii pauciglandulosi, glabrati; bracteae deciduae; calycis tubus cylindrico-obconicus, glaber; calycis lobi deltoidei, glabri, non ciliati, usque ad 0.8 mm. longi; corolla 3 mm. longa, glabra; stamina ca. 5 mm. longa; stylus minute hirsutus.

MEXICO: Chiapas, Cascada, near Siltepec, in woods, alt. 1600 m., March 3, 1945, *Eizi Matuda 5111* (LL, type), tree, 4–5 m. high, flowers white.

In some aspects this species resembles *V. optatum* var. *vagum* Morton of the Section Optata, and the two are closely related. The presence of glands in the inflorescence, the pubescence of branchlets and peduncles consisting of small stellate or simple stiff hairs, and the small ellipsoidal fruits appear to distinguish *V. siltepecanum*.

Viburnum subpubescens Lundell, sp. nov.—Ramuli dense albido-tomentosi, pilis sessilibus mollibus stellatis multiradiatis albidis; petioli albido-tomentosi, 5–7 mm. longi; lamina membranacea, ovato-elliptica vel lanceolata, 5–9 cm. longa, 3–5.5 cm. lata, apice subabrupte acuminata, basi rotundata, glandulosa, integra, ciliata, supra glabrata (venis exceptis), subtus pallidior novella dense stellato-pilosa, in stato adulto pauci pilosa; pedunculi albido-tomentosi, 3–4.5 cm. longi; cymae radii stellato-hirsuti; bracteae deciduae; calycis tubus ca. 1 mm. longus, glandulosus, hirsutus; calycis lobi deltoidei, 0.4–0.5 mm. longi, ciliati; corolla hirsuta; stylus glaber.

HONDURAS: Dept. Intibuca, La Esperanza, Banos Las Piletas, alt. 2000 m., April 3, 1956, *Antonio Molina R. 6216* (LL, type), fls. blancas, arbol 2–6 m.

The simple hairs of the calyx and corolla are short and bristly. On the undersurface of the leaf, the vein axils are conspicuously barbate as in

V. Hartwegi Benth. Although the deciduous bracts at the base of the inflorescence are up to 1.5 cm. long, *V. subpubescens* appears to belong in Section Disjuncta where it would have affinity to *V. disjunctum* Morton and *V. hondurense* Standl. The glandular inflorescence and calyx excludes it from *V. Hartwegi*. In *V. subpubescens* the bractlets at the base of the flowers are conspicuously longer than the calyx.

THE MEXICAN AND CENTRAL AMERICAN SPECIES OF DICHAPETALUM

Cyrus Longworth Lundell

In order to identify accumulated collections of *Dichapetalum* from the Maya Area, a review of the North American species was undertaken. Although the genus is well marked by peduncles usually united with the petioles, most of the species are difficult to delimit. Since the flowers are very similar in all the North American ones, vegetative differences must be relied upon to distinguish them. Pubescence and leaf type are dependable, although variable to a marked degree in *D. Donnell-Smithii* Engler.

Key

1. Branchlets and inflorescences minutely strigose with short stiff incurved closely appressed hairs; leaves glabrate, acute at base (British Honduras, Guatemala).....1. *D. Gentlei.*

1. Branchlets and inflorescences hispid or tomentose.

2. Branchlets and inflorescences hispid, the long hairs stiff and spreading; leaves emarginate or rounded at base.

3. Leaves small, thin, oblanceolate-oblong, 1.4–3 cm. wide (Costa Rica, Panama).....2. *D. Nevermannianum.*
3. Leaves large, strongly bullate, chartaceous, obovate, 5–15 cm. wide (Guatemala).....3. *D. bullatum.*

2. Branchlets and inflorescences tomentose, essentially velutinous-pilose, the hairs sometimes subappressed.

4. Pubescence of branchlets, inflorescences and fruits whitish, the fruits oblong-ellipsoid, up to 3.5 cm. long; leaves acute at base (Costa Rica, Panama).....4. *D. axillare.*
4. Pubescence of branchlets, inflorescences and fruits yellow-brown, the fruits usually obovoid, smaller; leaves usually rounded at base (Oaxaca, Chiapas, Tabasco, Guatemala, British Honduras, Honduras, El Salvador).....5. *D. Donnell-Smithii.*

1. **Dichapetalum Gentlei** Lundell, sp. nov.—Frutex scandens; ramuli graciles, novelli minute strigosi; stipulae lineari-lanceolatae, parvae, deciduae; petioli novelli minute strigosi, glabrati, 8–18 mm. longi; lamina pallida, novella parce strigosa, adulta omnino glabra, oblonga, oblanceolata

vel raro obovata, 7.5–18 cm. longa, 3.5–7 cm. lata, subabrupte acuminata, basi acuta, membranacea, nervis lateralibus primariis circa 6; cymae parvae multiflorae, minute strigosae, petiolo fere omnino cum pedunculo adnato; flores minute strigoso-tomentelli, albi; sepala elliptico-oblonga, ca. 2.3 mm. longa, apice late obtusa vel rotundata, intus glabra; petala glabra, late elliptica, ca. 2.3 mm. longa, medio bifida; stamina ca. 2.5 mm. longa; drupa subglobosa vel obovata, usque ad 2.3 cm. lata, 2.8 cm. longa, minute adpresso-tomentella.

GUATEMALA: Dept. Alta Verapaz, Sebol, about 6 km. nw., near Rubelquiche, in high forest, April 13, 1964, *Elias Contreras 4264* (LL), fruit greenish; Sebol, about 3 km. nw. of village, west of old Peten Road, on Arroyo Subterraneo, in high forest, April 14, 1964, *Contreras 4295* (LL), vine, fruit greenish; Sebol, about 4 km. on Coban Road, in high forest on hill, April 16, 1964, *Contreras 4361* (LL), vine, fruit greenish-brown; Sebol, on Coban Road, in high forest on hill, July, 1964, *Contreras 5383* (LL, type), woody vine. BRITISH HONDURAS: Toledo District, Edwards Road beyond Columbia, near Pate's Camp, in high ridge on hillside, Feb. 14, 1951, *Percy H. Gentle 7206* (LL), woody vine.

The distinctive indument of minute short closely appressed stiff hairs, pallid leaves entirely glabrous at maturity and the large subglobose or obovoid fruits well-mark *D. Gentlei* among the species of Mexico and Central America. At first the young leaves have a few short appressed stiff hairs along the midvein and primary veins, but these disappear before maturity. The relationship of the species appears to be with *D. axillare* Woodson of Costa Rica and Panama.

2. DICHAPETALUM NEVERMANNIANUM Standl. & Valerio, Field Mus. Pub. Bot. 18: 597. 1937.

COSTA RICA: Prov. Limon, Finca Montecristo, on the Rio Reventazon below Cairo, wet forest, alt. about 25 m., Feb. 18–19, 1926, *Paul C. Standley & Juvenal Valerio 48497* (US, isotype), slender shrub 8 ft., flowers white.

Woodson (Ann. Mo. Bot. Gard. 29: 353. 1942) reports the shrub from Bocas del Toro, Panama, *H. von Wedel 1424*. I have not seen this collection. The species is the most distinctive in Central America.

3. DICHAPETALUM BULLATUM Standl. & Steyerm., Field Mus. Pub. Bot. 23: 169. 1944.

GUATEMALA: Dept. Izabal, between Virginia and Lago Izabal, Montaña del Mico, alt. 50–500 m., April 5, 1940, *Julian A. Steyermark 38803* (US), vine; along road between Puerto Barrios and Santo Tomas, about 1½ miles southeast of Puerto Barrios, alt. 5–15 m., Dec. 7, 1941, *Steyermark 39874* (US, isotype), shrubby vine, leaves deeply rugose-sulcate-veined, flowers white, petals changing to blackish-purple when pressed.

A sterile collection from Guatemala, *Paul C. Standley 91317* (US), has bullate leaves but pubescence more typical of strigose forms of *D. Donnell-Smithii* Engler. It may represent an undescribed species.

4. DICHAPETALUM AXILLARE Woodson, Ann. Mo. Bot. Gard. 29: 353. 1942.

Dichapetalum Brenesii Standl., Field Mus. Pub. Bot. 23: 13. 1943.

COSTA RICA: La Ventolera, on southern slope of Volcan de Poas, wooded quebrada, alt. about 1700 meters, Feb. 17, 18, 1924, *Paul C. Standley 34674* (US), *34723* (US), small tree, 20 ft., flowers white; Zarcero, alt. 6500 ft., April 12, 1937, *Austin Smith 4120* (F, type of *D. Brenesii*), height 25 ft., base 8 in. diameter, flowers grayish-white, fruits grayish-green when immature; vicinity of Vara Blanca, north slope of Central Cordillera, between Poas and Barba volcanoes, alt. 1680–1710 m., June, 1938, *Alexander F. Skutch 3782* (US), *3788* (US), arborescent, 9 m., fls. white. PANAMA: Progreso, Chiriqui, 1927, *G. P. Cooper & G. M. Slater 172* (US), small tree, "*blancita*"; Prov. Cocle, hills north of El Valle de Anton, alt. 1000 m., July 14, 1940, *P. H. Allen 2202* (US, isotype of *D. axillare*), small tree 5 m. tall, fls. white.

The whitish tomentum and large oblong-ellipsoid fruits of *D. axillare* are notable features.

5. DICHAPETALUM DONNELL-SMITHII Engler, Bot. Jahrb. 23: 144. 1896.

Dichapetalum chiapasense Standl., Field Mus. Pub. Bot. 17: 196. 1937.

MEXICO: Oaxaca, District of Tuxtepec, Chiltepec and vicinity, alt. about 20 m., 1940–1941, *G. Martinez-Calderon 17* (US). Chiapas, Escuintla, July 1, 1936, *Eizi Matuda 630* (LL, MICH, US); Mt. Ovando, Dec. 24, 1936, *Matuda 679* (MICH, type of *D. chiapasense*; US); Mt. Ovando, alt. 2000 m., Nov. 14–18, 1939, *Matuda 4006* (MICH), woody vine; Mt. Ovando, near Escuintla, in second growth, July 16, 1940, *Matuda 4208* (LL, MICH, US), woody vine; Esperanza, near Escuintla, July 7, 1945, *Matuda 5419* (LL), *5420* (LL), a small tree, 3 m. high, "*durasnillo*"; Esperanza, near Escuintla, in bush, June 12, 1947, *Matuda A* (MICH); Escuintla, *Efraim Hernandez X. 231* (LL), shrub, 2 m., fruit brown tomentose, single seed. Tabasco, Achotal, near Balancan, May, 1939, *Matuda 6042* (LL). GUATEMALA: Dept. Alta Verapaz, Sacoyan Farm, about 30 km. from Coban, in forest on top of hill, May 29, 1964, *Elias Contreras 4845* (LL), fruit brownish. Dept. Escuintla, alt. 1100 pp., March, 1890, *John Donnell Smith 2067* (US, type of *D. Donnell-Smithii*). Dept. Huehuetenango, vicinity of Maxbal, about 17 miles north of Barillas, Sierra de los Cuchumatanes, alt. 1500 m., July 15–16, 1942, *Julian A. Steyermark 4880* (US), liana, rachis buff-brown, petals whitish. Dept. Izabal, vicinity of Quirigua, alt. 75–225 m., brushy slope, May 15–31, 1922, *Paul C. Standley 24496* (US), subscandent shrub, fls. greenish white. Dept. Peten, La Libertad and vicinity, June 9, 1934, *Mercedes Aguilar H. 243* (MICH). Dept. Sacatepequez, Acatepeque, alt. 4300 pp., Mar. 1892, *Smith 2500* (US). Dept. Santa Rosa, Volcan Tecuamburro, alt. 2300 m., Feb. 1893, *Heyde & Lux 4431* (US). Dept. Suchitepequez, Volcan Santa Clara, between Finca El Naranjo and upper slopes, alt. 1250–2650 m., May 23, 1942, *Steyermark 46613* (US). BRITISH HONDURAS: Corozal District, in high ridge, 1931–1932, *Percy H. Gentle 501* (MICH, US) vine. El Cayo District, Arenal, in secondary forest, 1936, *C. L. Lundell 6163* (MICH), slender woody vine; 35 Miles Section, Humming Bird Highway, in high ridge, July 27, 1956, *Gentle 9194* (LL), woody vine, flowers white. Stann Creek District, Middlesex, in high ridge, June 12, 1939,

Gentle 2864 (MICH, US), woody vine, fls. white. Toledo District, between Monkey River and Cockscomb, in high ridge, Oct. 25, 1943, *Gentle 4219* (LL), woody vine. HONDURAS: west of Tela, in thicket near beach above San Juan, Carib village, July 28, 1934, *T. G. Yuncker 4816* (MICH), shrub or small tree 15 ft. high; slopes of Mt. Congrejal, in forest, July, 1938, *Yuncker, et al. 8491* (MICH, US), *8732* (MICH, US), tree 20–25 ft. tall. EL SALVADOR: Dept. Sonsonate, vicinity of Izalco, alt. 400 to 600 m., Feb. 25, 1907, *H. Pittier 1977* (US); Santa Teela, Mar. 1923, *Salvador Calderon 1512* (US).

The types of *D. Donnell-Smithii* and *D. chiapasense* represent extreme forms of the taxon. In the former, the large thin obovate leaves and densely soft pilose indument are characteristic. In the type of *D. chiapasense* the leaves are small, lanceolate-oblong, chartaceous and sparingly strigose. Intermediate forms predominate. These have somewhat coarser pubescence than in the type of *D. Donnell-Smithii* and the hairs are often subappressed or appressed. The uniform yellow-brown tomentum of branchlets and inflorescences, brown-tomentose mostly obovate fruits, and flowers with no obvious differences clearly mark the populations as representing a single taxon.

In addition to the collections cited above, numerous others of *D. Donnell-Smithii* have been made in the Maya Area. Most of these were collected by Percy H. Gentle in British Honduras. They are in the Lundell Herbarium.

Leaves of *D. Donnell-Smithii* usually dry blackish. In Guatemala a very thin leaved densely pilose form dries yellow-green, and the fruits appear to be ellipsoid and smaller. Represented by *Heyde & Lux 4431* (US) and *John Donnell Smith 2500* (US), these may represent a variety or another species, but incomplete material makes description at this time inadvisable. This material may represent one of the parents of the type plant of *D. Donnell-Smithii,* which I suspect is a hybrid.

A METHOD FOR APPLYING MYSTOX (LAURYL PENTACHLORPHENATE) TO PROTECT MOUNTED HERBARIUM SPECIMENS

Cyrus Longworth Lundell and Richard Kirkham

The use of lauryl pentachlorphenate for the protection of herbarium specimens against insect infestation was instituted by Sir George Taylor while he was Keeper of the British Museum Herbarium. His method and others used by various institutions are described in the Manual for Tropical Herbaria (Regnum Vegetabile 39: 65–68. 1965) and by T. C. Whitmore (Taxon 14: 164–165. 1965).

According to Whitmore (l.c.): "Pentachlorophenyl laurate is a poison widely used industrially for the prevention of insect and fungus attack. Commercially it commonly goes under the name LPCP. Chlorinated phenols are highly poisonous compounds which are staining and dangerous to handle. The lauric ester of pentachlorphenol, however, is a colourless oily fluid which may be handled without risk. Of course reasonable care should be taken as with most chemicals, and thorough washing of hands is advisable after use. The digestive juices of the attacking organism readily hydrolise the ester and liberate the poisonous free pentachlorphenol which acts very rapidly, only a trace need be ingested."

Mystox (LPCP) is soluble in non polar solvents but not in polar ones such as alcohol and water. The method used at Renner consists of spraying mounted specimens with 5% lauryl pentachlorphenate (LPCP 100%) in the solvent, Varsol. The mixture has a kerosene-like odor which is not objectionable.

In December, 1965 the systematic treatment of all mounted specimens in the Lundell Herbarium at Renner was undertaken. A spraying apparatus was designed, and built in the shop of Texas Research Foundation by the junior author (Figs. 57 and 58). An adjustable spray gun is used to apply a fine mist under pressure which saturates the plant material (Fig. 59). Since the solvent may cause fading of some inks, a piece of cardboard is held in the left hand to shield labels, while the spray gun is operated by the right hand. A hypodermic needle is used to inject all packets containing plant material.

A team of three men process 750 sheets in two hours. This includes removal of specimens from herbarium, spreading out of sheets on tables, and spraying of sheets. In a large ventilated room, the material dries within twenty-four hours, at which time the specimens are unmarked and

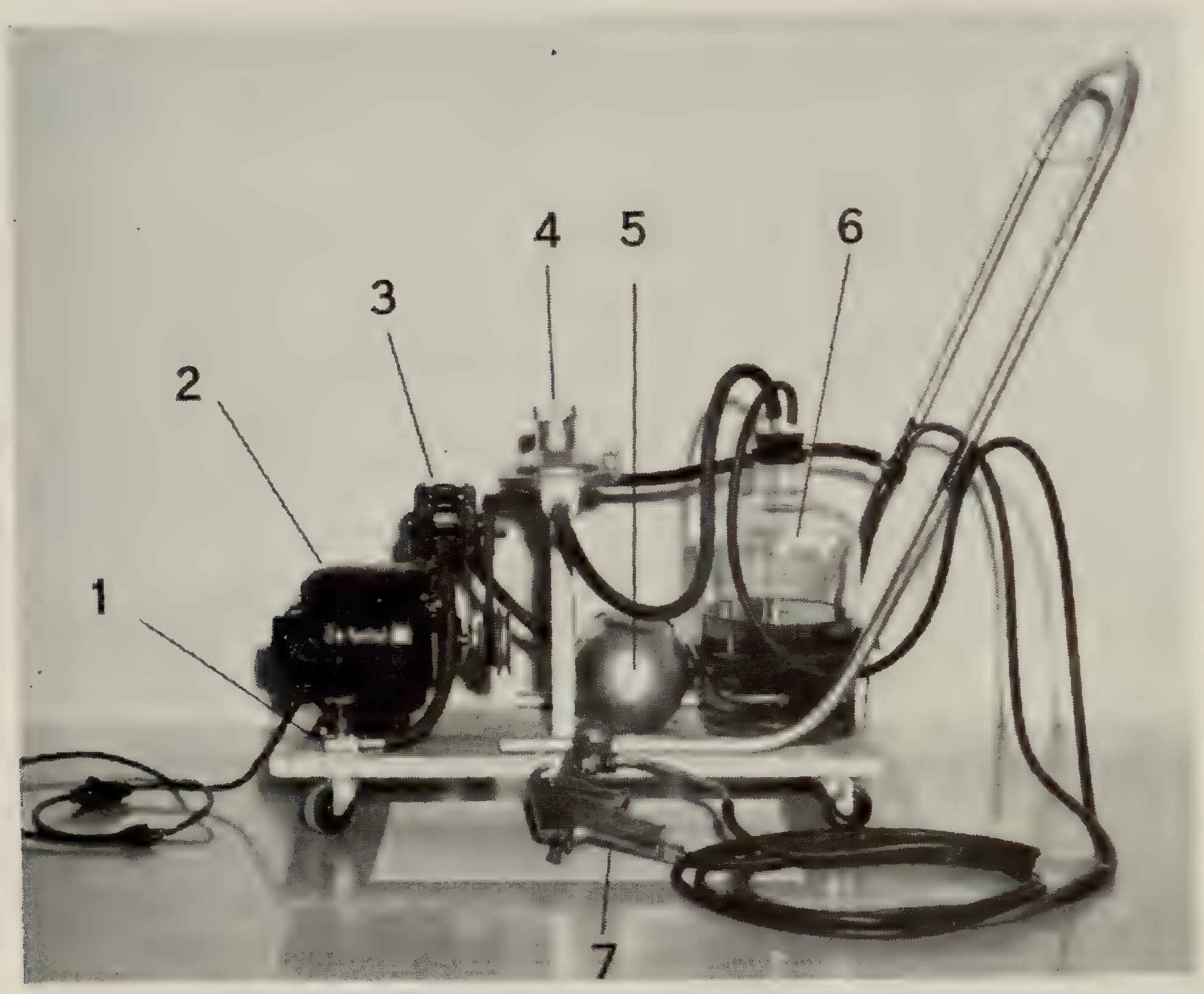


Fig. 57. View of the left side of spraying apparatus. 1, ⅛ inch valve; 2, ¼ horsepower 1750 r.p.m. motor; 3, pressure pump; 4, regulator; 5, pressure tank; 6, No. 1460 four liter reagent bottle with plain narrow mouth; 7, No. 30K15532 Sears Roebuck spray gun.

practically odorless. Specimens treated the previous day are gathered up and filed back in the herbarium each morning, and the process repeated.

The principal limitation is the space required for spreading out the mounted sheets. Five tables seventy-two feet long are utilized at Renner for treating 750 specimens daily. The tables (Fig. 59) consist of saw horses supporting four by eight foot pieces of either three-fourths inch plywood or sheetrock.

Approximately 15,000 mounted specimens are being processed monthly, and this procedure will be continued until the entire Lundell Herbarium has been treated. This will serve to determine the value of Mystox as a long term control for insects, as well as provide data on the effects on herbarium specimens of the treatment.

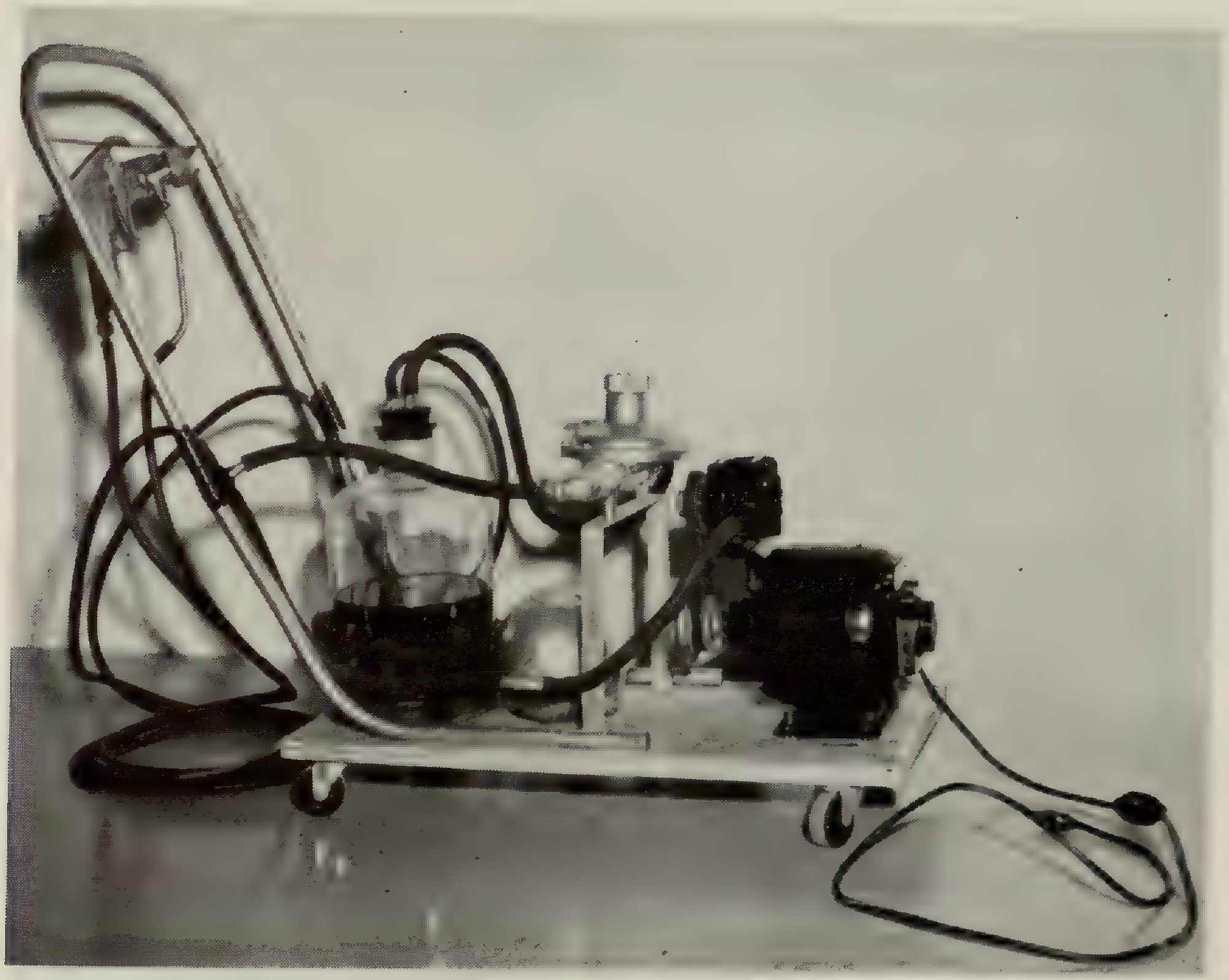


Fig. 58. View of the right side of spraying apparatus.

DESCRIPTION OF APPARATUS

A one-eighth inch needle valve (Fig. 57, no. 1) is connected to the suction side of the pump to control the pressure output of the pump. It should be adjusted to the condition desired in spraying.

The motor and pump (Fig. 57, nos. 2 and 3) come complete with belt and pulleys (Eberbach 18133B pressure and vacuum pump).

Fig. 57, no. 4, is a gas regulator with the spring tension increased to give an output pressure of approximately thirty inches of water. This pressure forces the liquid from the bottle (no. 6) to the spray gun. Any low pressure regulator can be used, but pressure should be only enough to raise the liquid to the height at which the spray gun will be operated.

The small pressure tank (Fig. 57, no. 5), connected to the pressure side of the pump, is used as an air volume chamber to eliminate pulsating action of the pump and to give a more constant pressure. A tee is used to connect the tank to the pump and air line to gun. Another tee is placed in the air line and connected to the inlet side of the regulator (Fig. 58).

Fig. 59. Use of spray gun in applying 5% solution of Mystox to herbarium specimens.

The bottle containing the spray solution (Fig. 57, no. 6) has a two-hole rubber stopper with two glass tubes, one long and one short, in it. The long tube reaches to the bottom of the bottle and is connected to the liquid line of the spray gun. The short tube is connected to the outlet side of the regulator.

Fig. 57, no. 7, is a pressure siphon feed, bleeder spray gun converted for external mix and has the cup removed. The liquid line is connected to the siphoning tube.

The liquid and air lines are of neoprene tubing one-fourth inch inside diameter, and seven-sixteenth inch outside diameter. The tubing between the machine and spray gun is approximately ten feet long.

The base of the machine is three-fourths inch plyboard with four swivel casters. The handle is formed from one-half inch thinwall electrical conduit.

A NEW PINYON VARIETY FROM TEXAS

Elbert L. Little, Jr.[1]

The pinyon or nut pine of the Edwards Plateau in southwestern Texas is distinguished here as a new variety of *Pinus cembroides* Zucc. and is compared with the two species of Trans-Pecos Texas.

From 1937 to 1941 I did research on *Pinus edulis* Engelm., the common species of pinyon, in Arizona and New Mexico as part of the research project of management of pinyon-juniper woodlands by the United States Forest Service (U.S. Dept. Agr., Agr. Handb. 271: 398–403, illus. 1965). The large edible seeds of that species are known as pinyon nuts (from Spanish piñón, plural piñones), pine nuts, and Indian nuts and provide an annual harvest of about a million pounds or more. As preliminary observations revealed differences among the pinyons, especially in seed characters of economic importance, a taxonomic study was begun. A preliminary note on *Pinus cembroides* (Southwest. Forest and Range Expt. Sta. Res. Notes No. 47, 3 pp. 1938) and an abstract (Amer. Jour. Bot. 27 (10) Sup. 24s. 1940) were published. However, work on the project was discontinued during World War II. Three species of pinyons were treated in Southwestern Trees (U.S. Dept. Agr., Agr. Handb. 9: 10–13, illus. 1950) and Key to Southwestern Trees (Southwest. Forest and Range Expt. Sta. Res. Rpt. 8: 4. 1951). The taxonomic report to be published soon will contain additional varieties.

I am greatly indebted to Dr. Donovan S. Correll, Head of the Botanical Laboratory, Texas Research Foundation, for taking me on a field trip to the main pinyon areas of western Texas the week of April 1–5, 1963.

Pinus subsect. *cembroides* Engelm. (St. Louis Acad. Sci. Trans. 4: 176, 178. 1880) contains the pinyons or nut pines, 8 species of dwarf trees and shrubs of semiarid regions of southwestern United States and Mexico, characterized by short entire leaves 5–1 in a fascicle and large wingless edible seeds. They are generally classed among the soft pines, *Pinus* subgenus *Strobus* Lemm. (*Haploxylon*), having leaves with 1 vascular bundle and deciduous sheath, also in sect. *Parrya* Mayr (*Paracembra*) with umbo of cone-scale dorsal. *Caryopitys* Small (Fl. Southeast. U. S. 29, 1326. 1903) was proposed as a generic segregate for the pinyons, but only 2 species were transferred to it. Distribution maps of the 8 species have been published recently by William B. Critchfield and Little (U.S. Dept. Agr. Misc. Pub. 991, maps 15–18. 1966).

The 4 species of pinyons native in the United States were described in

---

[1] Forest Service, United States Department of Agriculture, Washington, D. C.

detail and well illustrated by Charles S. Sargent (Silva No. Amer. 11: 43–57, illus. 1897) and George B. Sudworth (Forest Trees Pacific Slope 33–37, illus. 1908; U.S. Dept. Agr. Bul. 460: 15–23, illus. 1917). Andreas Voss (Deut. Dendrol. Gesell. Mitt. 16: 91, 95. 1907 [1908]) reduced them to varieties under the oldest named species, *Pinus cembroides*, believing the variations were mainly in number of leaves in a fascicle and that there were intermediate forms. Some authors have followed this reduction, but not the United States Forest Service (Sudworth, U.S. Dept. Agr. Misc. Circ. 92: 14–15. 1927; Little, U.S. Dept. Agr., Agr. Handb. 41: 262–271. 1953). Trees of the 4 species maintain their differences when growing together in the Eddy Arboretum, Institute of Forest Genetics, Placerville, Calif.

Apparently the first report of pinyons from the Edwards Plateau was in 1885 by V. Havard (U.S. Natl. Mus. Proc. 8: 477, 503. 1885), who recognized in western Texas only one species, *Pinus edulis*. John M. Coulter (Man. Phan. Pterid. West. Texas 554–555. 1894) added *P. cembroides* from near Presidio. Sargent (Man. Trees No. Amer. Ed. 2, corr. 9. 1926) placed the pinyon of the Edwards Plateau under *P. cembroides* in the restricted, typical sense. In the latest list of Texas plants, F. W. Gould (Tex. Agr. Expt. Sta. MP-585: 16. 1962) recorded *P. cembroides* and *P. edulis* both from Edwards Plateau and Trans-Pecos Texas.

The pinyons of western Texas, three taxa with mostly separate ranges, may be identified by the following key:

1. Needles stout, rigid (1.0–1.4 mm. wide) mostly 2; bud-scales mostly short and acute; seeds thin-shelled (0.3–0.4 mm.); in Guadalupe Mts. and Sierra Diablo, Trans-Pecos Texas..... *P. edulis*.
1. Needles slender, flexible (0.7–1.0 mm. wide); bud-scales mostly long acuminate, with dark red point.
   2. Needles mostly 3; seeds thick-shelled (0.5–1.0 mm.); in Trans-Pecos Texas..... *P. cembroides* var. *cembroides*.
   2. Needles mostly 2; seeds thin-shelled (0.1–0.4 mm.); in Edwards Plateau, also southern Pecos County and northwestern Brewster County in Trans-Pecos Texas..... *P. cembroides* var. *remota*.

PINUS EDULIS Engelm. in Wisliz., Mem. Tour. North. Mex. 88. 1848.

Pinyon

This species is characterized by stout rigid leaves or needles (1.0–1.4 mm. wide), mostly 2 in a fascicle, and by thin-shelled seeds (0.3–0.4 mm.). It is known in the State only from 2 localities in Trans-Pecos Texas: Guadalupe Mountains, which extend from southeastern New Mexico less than 10 miles into northwestern Culberson County, almost 100 miles east

of El Paso. Sierra Diablo, in eastern Hudspeth County, less than 50 miles south of the first locality. No specimens of pinyons have been recorded from the Texas Panhandle.

Description by Engelmann from a specimen collected by A. Wislizenus near Santa Fe, "not rare from the Cimarron to Santa Fe and probably throughout New Mexico." The seeds had a "shell much thinner than a hazlenut's" and "testa tenuiore."

PINUS CEMBROIDES Zucc., K. Bayer. Akad. Wiss. München, Abhandl. Math.-Phys. 1: 392. 1832; Flora [Jena] 15 (2), Beibl. 93. 1832.

The pinyon stands of Texas, except for the two already cited under *Pinus edulis*, are referred here to *P. cembroides* Zucc.

PINUS CEMBROIDES var. CEMBROIDES — Mexican pinyon

The typical variety is characterized by slender flexible leaves or needles (0.7–1.0 mm. wide), mostly 3 in a fascicle, and by thick-shelled seeds (0.5–1.0 mm.). It is known from the State only from three counties of Trans-Pecos Texas: Brewster, Jeff Davis, and Presidio.

Named from a specimen collected by Wilhelm F. Karwinski in central Mexico, apparently near Zimapán, Hidalgo (Endlicher, Syn. Conif. 183. 1847). The seed coat or testa was described as "subossea" and "cornea dura." *Pinus osteosperma* Engelm. (in Wisliz., Mem. Tour North. Mex. 89. 1848), a synonym, likewise had thick-shelled seeds as indicated by the specific epithet and the descriptive words "testa dura" and "nut of the same size, but much harder" than *P. edulis*. The holotype from Saltillo, Coahuila, *Josiah Gregg in 1847* (MO), has testa 0.6–0.8 mm. thick.

Pinus cembroides Zucc. var. **remota** Little, var. nov. — Texas pinyon

A varietate typica differt seminibus testa tenuiore (0.1–0.4 mm.) atque foliis 2, interdum etiam 3, in fasciculo.

Arbor parva corona rotunda extensa, ramulis tenuissimis, griseis; gemmae cylindricae, acutae, leviter resinosae, squamis elongato-acuminatis, apice atro-rubro; folia 2, interdum etiam 3, in fasciculo, vagina paulatim decidua, tenuissima, flexilia, brevia, plerumque 3–4.5 cm. (2–5.5 cm.) longa, 0.7–1.0 mm. lata, acuminata, integra, superficie dorsali opaca flavoviridi, ventrali leviter glauca; stomata dorsalia plerumque 3–4 seriebus et stomata ventralia 3–5 seriebus; strobili subterminales, solitarii vel interdum bini, brevi-pedunculati, subglobosi, dehiscentes et decidui, parvi, 2–4 (4.5) cm. longi, fulvi vel ochracei; squamae paucae, apophysis rhomboidea, pyramidalis, crassa, umbone dorsali plano inermi; semina pauca, gemina vel solitaria, obovoidea vel ellipsoidalia, magna, 12–16 mm.

longa, 7–10 mm. lata, 6–8 mm. crassa, base obtusa, apice rotundo, aptera, testa tenuiore (0.1–0.4 mm.).

Differs from the typical variety in the thin-shelled seeds (0.1–0.4 mm.) and in the leaves 2, sometimes also 3, in a fascicle.

Small tree 3–9 m. high, with trunk 15–40 cm. in diameter and rounded spreading crown. Bark gray to blackish, rough, thick, furrowed or with scaly plates. Spring shoots uninodal. Twigs very slender, gray. Buds cylindric, acute, slightly resinous, bud-scales long acuminate, dark red at apex.

Leaves or needles 2, sometimes also 3, in a fascicle, with light brown membranous sheath about 5 mm. long and gradually deciduous, very slender, flexible, short, mostly 3–4.5 (2–5.5 cm.) long, 0.7–1.0 mm. wide, straight and erect to slightly curved and spreading, acuminate, entire, dorsal surface dull yellow green, ventral surface slightly glaucous, with inconspicuous whitish lines of stomata on surfaces. Needle anatomy in cross section: dorsal stomata mostly 3–4 rows, ventral stomata 3 -5 rows (needles in 3's, dorsal stomata mostly 2–3 rows, ventral stomata 2 (3) rows on each surface), stomata slightly sunken; hypodermis uniform, of 1 or 2 layers of thick-walled epithelial cells; endodermis circular in cross section, the cells slightly thick-walled; thick-walled cells forming lines outside phloem and xylem of the single vascular bundle.

Male strobili numerous, crowded, subglobose, 3 mm. long (immature), light yellow or pink. Year-old conelets on scaly stalk of about 4 mm., erect or spreading, subglobose, 7–8 mm. long and broad, brown, the umbo rhomboidal, with weak horizontal keel and minute prickle.

Cones subterminal, single or sometimes paired, on a short stalk of 5–7 mm., subglobose, dehiscent and deciduous, small, 2–4 (4.5) cm. long, 2–3.5 (4) cm. in diameter when closed and 2.5–6 cm. when open, yellow brown to orange brown or reddish tinged. Cone-scales few, the apophysis rhomboidal, thick, keeled, the dorsal umbo flat, without prickle, apical and basal cone-scales reduced and sterile. Seeds few, paired or single, obovoid or ellipsoidal, large, 12–16 mm. long, 7–10 mm. wide, 6–8 mm. thick, obtuse at base, rounded at apex, wingless, thin-walled (0.1–0.4 mm.).

DISTRIBUTION: Southwestern Texas, Edwards Plateau (Edwards, Kerr, Kinney, Real, Uvalde, Val Verde, and Zavala counties) and Trans-Pecos Texas (southern Pecos and northeastern Brewster counties).

TEXAS: Brewster County, 26 miles east of Marathon, alt. 2500 ft., April 1, 1963, *E. L. Little, Jr. & D. S. Correll 18994* (A, LL, TEX, US); Glass Mts., 26 miles northeast of Alpine, alt. 4600 ft., July 20, 1957, *B. H. Warnock 15566* (LL); foothills of Glass Mts. about 20 miles east of Alpine, June 26, 1945, *C. H. Muller 8159* (LL); near summit, rocky soil, north slope and summit of Old Blue Mt., Glass Mts., April 1, 1946, *D. S.*

Correll 13576 (NA). Edwards County, canyon in Edwards Plateau 9 miles southeast of Rocksprings, alt. 2500 ft., oak-pinyon woodland, April 4, 1963, *E. L. Little, Jr. & D. S. Correll 19014, 19015, 19016, 19017* (A, LL, TEX, US); Rocksprings, April 17, 1930, *Marcus E. Jones 26410* (A, DS, LA, US); Rocksprings, rocky ridges, alt. 3000 ft., Oct. 11, 1916, *E. J. Palmer 10984* (A, CAS, DS, US); Rocksprings, July 14, 1902, *Vernon Bailey 673* (US). Kinney County, along Edwards County line, 23 miles north of Brackettville, scattered, *D. S. Correll & I. M. Johnston 21214* (LL). Eagle Pass (county?), March 23, 1932, *Marcus E. Jones 29007* (POM). Pecos County, 25 miles south of Fort Stockton, April 18, 1919, *H. C. Hanson 664* (MO, NY, US); Madera Mts., 28 miles south of Ft. Stockton on road to Marathon, May 30, 1962, *D. S. Correll & C. Schweinfurth 25415* (LL); Glass Mts. on Ft. Stockton-Marathon road, March 16, 1941, *R. R. Innes & B. H. Warnock 459* (GH); Uvalde County, head of Montell Creek, 8 miles west of Montell, dry rocky slope, July 25, 1946, *D. S. Correll 13451* (NA); Montell, steep hillsides in canyons, June 22, 1917, *E. J. Palmer 12327* (A, RM, UC, US). Val Verde County, 30 miles north of Del Rio and 13 miles south of Loma Alta, alt. 1500 ft., cedar brake near crests of nearly level plain, shallow rocky soil on limestone, rare and local, April 1, 1963, *E. L. Little, Jr. & D. S. Correll 18991* (holotype, US; isotypes, A, LL, NA, NY, OKL, TAES, TEX, UC), *18992, 18993* (AA, LL, TEX, US).

Rare and local in cedar brakes near crests of nearly level plains in the southern part of Edwards Plateau. Associated plants at the type locality include: *Juniperus monosperma, Rhus virens, Diospyros texana, Euphorbia spathulata, Acacia, Yucca, Dasylirion,* and *Opuntia.* Also scattered in canyons, for example, 9 miles southeast of Rocksprings. Associated plants in the oak-pinyon woodland there include: *Quercus* spp., *Juniperus Ashei* (eradicated), *Diospyros texana,* and *Sophora.*

Also in Trans-Pecos Texas, in plains and low mountains east of the Davis Mts. and other high mountains. For example, east of Marathon, scattered and common near tops of rocky mesas, where associated plants are: *Juniperus monosperma, Sophora, Fraxinus Greggii, Agave lecheguilla, Fouquieria splendens, Dasylirion, Yucca,* and *Opuntia.* These plains west of Pecos River are classed as a part of the Edwards Plateau in the map of vegetational areas of Texas by Gould (Tex. Agr. Expt. Sta. MP-585. 1962).

Morphological characters place the pinyon of Edwards Plateau with *Pinus cembroides.* Needle thickness indicates closer relationships than variable needle number. Bud-scales in this species are mostly long acuminate, ending in a long, tapering, dark red point, but mostly short and acute in *P. edulis.* Twigs of the former are more slender, only about 2 mm. in diameter. Male strobili of *P. cembroides* are smaller also.

Cones of *Pinus cembroides* are often orange brown or reddish tinged, while those of *P. edulis* are yellow brown. Cone stalks are slightly longer in the former (5–8 mm.) than in the latter (2–3 mm.). Seeds of both species are similar in chemical composition, about 60 percent fat, according to

C. W. Botkin and L. B. Shires (N. Mex. Agr. Expt. Sta. Bul. 344, 14 pp., illus. 1948). Filled seeds of var. *remota* were not available for analysis.

The pinyon of Edwards Plateau is nearer geographically to *Pinus cembroides* and is linked by intermediates with needles both 2 and 3 and with seeds of intermediate thickness. In Davis Mountains and eastward in Trans-Pecos Texas a few specimens of both varieties of *P. cembroides* have slightly thickened needles perhaps intergrading toward *P. edulis.*

Parasitism by dwarf-mistletoe, *Arceuthobium divaricatum* Engelm. (*A. campylopodum* Engelm. f. *divaricatum* (Engelm.) Gill), indicates that some trees in Davis Mountains may be physiologically intermediate between the two species. An example is the host of *Little & Correll 19003*, identified as *Pinus cembroides* var. *cembroides* though perhaps intermediate. This parasite is widespread on *P. edulis* but elsewhere unknown on *P. cembroides.*

Jack McCormick and John W. Andresen (Ohio Jour. Sci. 63: 162. 1963) mentioned that Marion T. Hall had observed in central New Mexico, from the Sacramento Mountains northward to the Sandia Range, trees considered to be introgressants of *Pinus edulis* and *P. cembroides.*

Pinus cembroides var. *remota* might be partly of hybrid origin between the two species or possibly an ancestral intermediate type. Because of present isolated distribution, hybridization or gene exchange in Texas is unlikely now, except through the bare possibility of wind borne pollen. The large, wingless seeds are adapted to dispersal by rodents for short distances.

The pinyon trees in scattered, remote stands eastward to the Edwards Plateau occur on the most favorable sites and apparently are not spreading. The canyons and rocky crests of plains and mesas perhaps have more porous soil and higher available soil moisture than the intervening plains. Old cones on the ground under the trees are scarce. The cones mostly are small and have produced relatively few seeds. A resident of Montell reported that in northwestern Uvalde County the pinyon trees had borne only three or four cone crops in 18 years, also a few seeds in other years. Heavy grazing by sheep may damage and reduce reproduction.

It is unlikely that pinyons migrated to these isolated localities under present climatic conditions. Apparently the pinyons of Edwards Plateau are relics of a more widespread pinyon-juniper woodland. During periods of maximum glaciation in the Pleistocene epoch, the vegetation zones of mountains in western United States may have shifted downward as much as 3,000 feet or more.

Philip V. Wells (Scarp woodlands, transported grassland soils and concept of grassland climate in the Great Plains Region. Science 148: 246–249, illus. 1965) has suggested that woodlands on escarpments in the

Great Plains are relics of formerly more extensive woodlands and that the scarps may have served primarily as refugia from grass fires.

Additional evidence has been reported recently by P. V. Wells (Significance of a wood rat midden deposit of late full-glacial age from the Chihuahuan desert. Abstract. Ecol. Soc. Amer. Bul. 46: 197. 1965). He found abundant remains of *Pinus cembroides* in a wood rat (*Neotoma*) midden deposit at about 4,000 feet on Burro Mesa, Brewster County, Texas, in a zone presently vegetated by Chihuahuan Desert scrub. This Pleistocene deposit had a radiocarbon age of 18,750 ± 360 years and indicates a former more widespread distribution at lower altitudes.

Pinus cembroides var. *remota* merits testing for possible economic applications. According to its distribution, it may be one of the hardiest pines for semiarid warm temperate regions, under conditions of both low moisture and high temperatures. Its altitude, only 1500 to 2500 feet, is the lowest of all pinyons, a remarkable group of pines adapted to climates of low rainfall and droughts. Its latitude, 30° north, is warm temperate. This variety may have possibilities for planting in semiarid lands, including erosion control, shelterbelts, wildlife cover and food, Christmas trees, and small amounts of timber. However, growth under these severe conditions probably is very slow.

Sooner or later tree breeding programs on pinyons may be undertaken for increased pinyon nut production of selected trees under cultivation or of wild trees under intensive management. This variety with thin-shelled seeds should be included.

TWO NEW PLANTS IN TEXAS

Donovan S. Correll

The most conspicuous of the Texas junipers that occur in the mountains and foothills of the Trans-Pecos region is *Juniperus Deppeana* Steud., commonly called "alligator juniper" because of the typically thick and checkered bark of its main trunk and larger branches. In 1940, O. E. Sperry found what I consider to be an unusual variant of this species as evidenced by some of the photographs of it that are here reproduced (Figure 60) with Dr. Sperry's permission. It is a pleasure to name this unusual plant for Dr. Sperry, who is well-known for his work, "Plants of Big Bend National Park."

Juniperus Deppeana Steud. var. **Sperryi** Correll, var. nov.

Cortex in longitudinem sulcatus et squamosus; rami et ramuli marcidi et penduli; ramunculi tenues; folia fere cum maculis fulgidis parce sparsa, glans obscura dorsalis raro fracta; fructus sicci, fructibus varietatis *Deppeanae* similes.

Bark longitudinally furrowed and scaly; branches and branchlets flaccid and drooping; twigs slender; leaves usually sparsely sprinkled with glistening specks, the inconspicuous dorsal gland rarely ruptured; fruits dry, similar to those of var. *Deppeana*.

TEXAS: Culberson County, sheltered upper slopes, McKittrick Canyon, Guadalupe Mts., alt. 2,000 m., July 17, 1931, *J. A. Moore & J. A. Steyermark 3472* (A, GH, NY, PH, US). Jeff Davis County, rocky ground, in canyon, Davis Mts., a tree 18 m. tall, 1 m. diam., bark ridgy and scaly, *not checkered*, June 4, 1928, *E. J. Palmer 34339* (A, PH); growing on an open grassy slope on the south side of Dry Canyon, about 8 miles from Sproul Ranch headquarters, Davis Mts., 6,000 ft. elev., a lone tree noticeably different from the other trees in the region due to the "weeping" or drooping nature of the branches and branchlets, trunk in two parts, united near the ground level, bark shaggy furrowed, grayish brown, reddish beneath the weathered outer layer, younger branches quite reddish, bark starts getting scaly on second year wood and is loosely scaly on all branches, Dec. 30, 1940, *Omer E. Sperry T870* (type, GH; isotype, US).

Although Moore and Steyermark did not mention the bark of the tree from which they obtained their specimens, an examination of these has convinced me that it is referable to this variety. Another of their collections (No. 3473) from the same area is typical var. *Deppeana*. Palmer's collection, which has stoutish twigs similar to those of var. *Deppeana*, appears to represent a "bridge" between the two variants.

A revision of the gentianaceous genus *Bartonia* in 1959 by J. M. Gillett (Rhodora 61: 43–57) included the three traditional species, the Linnean

Fig. 60. *Juniperus Deppeana* Steud. var. *Sperryi* Correll (*Sperry T870*): upper left, habit and habitat; lower left, trunk to show scaly (not checkered) bark; lower right, habit of branches; upper right, close-up of branch to show drooping habit and fruit. Photographs by O. E. Sperry.

B. virginica (L.) BSP. and the two species established by Michaux, *B. paniculata* (Michx.) Muhl. and *B. verna* (Michx.) Muhl. All three of these species are distinctive and exceptionally stable.

Fig. 61. *Bartonia paniculata* (Michx.) Muhl. (*Palmer 14397*): 1, habit, × 1; 2, flower, with one sepal spread out, × 5; 3, calyx, spread out, × 5; 4, corolla, spread out, × 5; 5, capsule, × 5.

Bartonia texana Correll (*Correll 32006*): 6, habit, × 1; 7, flower, × 5; 8, calyx, × 5; 9, corolla, × 5; 10, capsule, × 5. Illustrated by Vivien Frazier.

Since 1918, *B. paniculata* has been known to occur in Texas (Houston County, sandy bogs, Grapeland, September 6, *E. J. Palmer 14397*, US No. 1603760). Recently, a widespread colony of numerous, strikingly uniform, plants of a most distinctive *Bartonia* was discovered in east Texas where a gently sloping pine-hardwood forest meets a large woodland bog. In habit, this plant resembles *B. paniculata* (Figure 61). It is here proposed as a fourth species for this genus.

Bartonia texana Correll, sp. nov.

Planta parum insignis, glabra, ad 3 dm. alta; caulis tenuis, rigidus, fere rectus; folia squamiformia, alterna vel raro subopposita, circiter 1 mm. longa; flores in racemo tenui laxo vel panicula; pedicelli tenues, ascendentes, ad 1.5 cm. longi; calyx 1.5–2 mm. longus lobis triangulo-lanceolatis et acutis; corolla albescens, circiter 2.5 mm. longa, lobis ellipticis et obtusis vel obtuso-apiculatis; stamina in sinu petalorum; capsula ellipsoidali-subquadrata, corollam fere superans, styli separatione ad apicem dehiscens; stylus persistens circiter 0.5 mm. longus.

Plant inconspicuous, glabrous, up to 3 dm. high; stem slender, usually rigidly erect; leaves scale-like, alternate or rarely subopposite, about 1 mm. long; flowers in a slender lax raceme or panicle; pedicels slender, ascending, up to 1.5 cm. long; calyx 1.5–2 mm. long, the lobes triangular-lanceolate and acute; corolla whitish, about 2.5 mm. long, the lobes elliptic and obtuse to obtuse-apiculate; stamens in sinus of petals; capsule ellipsoidal-subquadrate, usually exceeding the corolla, dehiscent at apex by separation of the style, the persistent style about 0.5 mm. long.

TEXAS: Tyler County, along Clear Creek, forested hills, 7.5 miles southeast of Colmesneil on Route #256, on sphagnum moss, plants green, October 10, 1965, *D. S. Correll 32006* (type, LL; isotypes, US, GH).

The following key conveniently separates the two species now known to occur in Texas.

Calyx about 3 mm. long; corolla about 5 mm. long, the lobes lanceolate and tapering to an acute to acuminate apex; capsule shorter than the corolla, the style about 1.5 mm. long..... *B. paniculata.*

Calyx 1.5–2 mm. long; corolla about 2.5 mm. long, the lobes elliptic and obtuse to obtuse-apiculate; capsule usually exceeding the corolla, the style about 0.5 mm. long..... *B. texana.*

Part of a project, Manual of the Vascular Plants of Texas, supported, in part, by a grant from National Science Foundation.

STUDIES OF THE AMERICAN MYRSINACEAE—III

CYRUS LONGWORTH LUNDELL

Ardisia Swartz is a large genus in tropical and subtropical areas with most species in Asia and America. Although having some well defined natural groups, it contains many of uncertain affinities. My interest is primarily in the species of Middle America, and materials for a treatment of these are being assembled.

Through the generous cooperation of officials of the Botanical Museum of the University of Copenhagen, it has been possible to examine on loan the historical types of O. Swartz, A. S. Oersted and Carl Mez. Included in this paper are studies based on the Copenhagen material, a revision of the subgenus *Graphardisia* Mez together with descriptions of new species of *Ardisia*, and notes on other species and genera.

ARDISIA, Subgenus *Graphardisia*, Pflanzenreich IV. 236: 78. 1902.

Shrubs or small trees, entirely glabrous; leaves petiolate, the blades conspicuously punctate, entire or crenulate, thin or subcoriaceous; inflorescences terminal 1–3-pinnately paniculate, punctate, with large white thin densely punctate involucrate bracts and bractlets, these usually persistent; pedicels slender, elongate; flowers corymbose, conspicuously punctate; sepals thin, large, punctate, nearly enclosing the fruits at maturity, glanduliferous at base within; corolla conspicuous, rotate, the petals ovate or elliptic, imbricate, united at base into a short tube, glanduliferous at base within, white, pink, lavender, or purple; filaments stout, glanduliferous, less than half the length of anthers; anthers ovate-lanceolate or lanceolate, tapering to the apex, apiculate, dehiscent by apical pores; style slender, equaling sepals; placenta apiculate, the ovules biseriate or pluriseriate, 12 to 14, or numerous.

Key

Leaves conspicuously crenulate.....1. *A. Wagneri.*
Leaves entire, or essentially entire.
  Leaf blades subcoriaceous, lucid; anthers small, ovate-lanceolate, about 2.5 mm. long.....2. *A. subcoriacea.*
Leaves membranaceous; anthers larger, lanceolate or linear-lanceolate.
  Leaf blades broadly elliptic or obovate-elliptic, up to 13.5 cm. wide, 30 cm. long; inflorescences congested, with sessile or subsessile primary branches.....3. *A. paquitensis.*
  Leaf blades narrowly lanceolate-elliptic, lanceolate or oblanceolate; inflorescences open, large.

Ovules numerous; inflorescences usually 2–3-pinnate; sepals large, elliptic, usually punctate with small glands; petioles marginate to base.....4. *A. Seibertii.*

Ovules 12–14; inflorescences usually 1–2-pinnate; sepals typically oblong, sometimes oblong-elliptic, usually black punctate with large conspicuous glands, these often forming ridges; petioles canaliculate, not marginate to base.....5. *A. opegrapha.*

1. ARDISIA WAGNERI Mez, Pflanzenreich IV. 236: 79. 1902.

PANAMA: Prov. de Chiriqui, vicinity of San Bartolome, Peninsula de Burica, alt. 0–50 m., July 28–Aug. 1, 1940, *R. E. Woodson, Jr. & R. W. Schery 906* (F, LL, MO), shrub 2 m., bracts and calyx pink-red.

I have not examined the type of *A. Wagneri*, but *Woodson & Schery 906* appears to be referable to this species. The calyx of the fruiting specimen is slightly larger and narrower than described by Mez.

2. **Ardisia subcoriacea** Lundell, sp. nov.

Frutex, 1.5 m.; ramuli crassiusculi, glabri; folia petiolis (3) 6–10 (12) mm. longis stipitata; lamina subcoriacea, lucida, lanceolata vel anguste elliptico-lanceolata, 5–13 cm. longa, 2.5–5 cm. lata, apice acuminata, basi acuta vel subcuneata, perpunctata, integra, glabra; inflorescentia terminalis, late paniculata, ca. 4 cm. longa, congesta, glabra; pedicelli usque ad 2 cm. longi; flores corymbosi, glabri; sepala elliptica, 4–5 mm. longa, 3–3.2 mm. lata, nigropunctata; corolla 5.5–7 mm. longa, tubo ca. 2 mm. longo, lobis late ovatis, 2-lineatis; stamina parva, 3–3.5 mm. longa; filamenta crassa, 1.5–1.75 mm. longa, glandulifera; antherae lanceolatae, ca. 2.5 mm. longae, poris apicalibus dehiscentes; ovarium glabrum; stylus 4–5 mm. longus; placenta subglobosa, apiculata; ovula 14, biseriata.

PANAMA: Prov. de Cocle, El Valle de Anton, vicinity of La Mesa, about 1000 m., June 22, 1941, *Paul H. Allen 2571* (US, type; F, LL, isotypes), shrub, 1.5 m. tall, flowers bright shell pink, stamens yellow.

Although the bracts are not persistent, *A. subcoriacea* is clearly referable to the Subgenus *Graphardisia* Mez, which is easy to distinguish, but difficult to characterize.

The small subcoriaceous leaves are distinctive in this natural group. The lateral veins, very slender on both surfaces, probably are indiscernible in fresh condition. The petioles are not marginate to base as in the related *A. opegrapha* Oerst. *A. subcoriacea* is noteworthy further for its small flowers, elliptic sepals having a distinctive clear hyaline margin, and short stamens.

3. ARDISIA PAQUITENSIS Lundell, Phytologia 2: 4. 1941.

COSTA RICA: Prov. San Jose, low hills above Rio Paquita, alt. 5–50 m., Aug. 15, 1936, *C. W. Dodge & V. F. Goerger 9885* (F, type; MO, isotype; LL, fragment and photograph); Prov. de Puntarenas, Canton de Osa, vicinity of Palmar Norte, banks and pastures along Rio Grande de Terraba, sea level, July 2, 1949, *Paul H. Allen 5317* (F, LL, MO, UC, US), shrub, 2–4 ft., fls. rich purple, very common.

The flowers of *A. paquitensis* are described by Allen as rich purple, while collectors give the color of the flowers of *A. opegrapha* Oerst. as white or pale pink. Otherwise, the flowers of the two species do not differ significantly.

A. paquitensis has large entire obovate or elliptic leaves up to 30 cm. long and 13.5 wide, with canaliculate petioles up to 2.5 cm. long, much larger than those of *A. opegrapha*. Probably the most distinctive feature of the species is its small congested inflorescence. The primary branches of the inflorescences are sessile or branched within 5 or 6 mm. of base.

4. ARDISIA SEIBERTII Standl., Ann. Missouri Bot. Gard. 24: 198. April, 1937.

Ardisia Skutchii Morton, Journ. Wash. Acad. Sci. 27: 309. July, 1937.

COSTA RICA: Prov. San Jose, vicinity of El General, in forest, alt 1070 meters, June, 1936, *Alexander F. Skutch 2660* (US, type of *A. Skutchii*; MO, isotype), shrub, 7.5 m., inflorescence white, corolla tinged with pink; vicinity of El General, in forest, 1190 meters, Nov. 1936, *Skutch 2890* (MO, US), shrub 7 m., fls. pinkish, bracts whitish, berry black, 1 cm. diameter, fruiting calyx purple; vicinity of El General, in forest, alt. 670 meters, June, 1939, *Skutch 4371* (F, MO, US), slender, arborescent, 6 m., fls. white.

PANAMA: Prov. de Cocle, El Valle de Anton and vicinity, 500–700 m., July 23–27, 1935, *R. J. Seibert 456* (F, type of *A. Seibertii*; MO, isotype), flowers white; vicinity of El Valle, 800–1000 m., Dec. 22, 1936, *P. H. Allen 72* (F, MO), small tree 3 m., fleshy calyx pink; between Las Margaritas and El Valle, July 15–August 8, 1938, *R. E. Woodson, Jr., P. H. Allen & R. J. Seibert 1239* (LL, MO), tree 8 m., calyx and pedicel white, corolla pink; same locality, *Woodson, Allen & Seibert 1746* (MO), shrub 3 m., petals white, faint lavender tinge; vicinity of El Valle, 800–1000 m., Sept. 5, 1938, *Allen 786* (LL, MO), small tree 2 m., fls. pale pink; El Valle de Anton, in forest, alt. 900 m., June 4, 1939, *A. H. G. Alston 8719* (US), shrub 8 ft., fls. rosy lilac; north rim of El Valle, June 4, 1939, *A. H. G. Alston & P. H. Allen 1846* (MO, US), small tree 4 m., fls. pale lavender; El Valle de Anton, dry slopes (south) about 750 m., July 2, 1941, *Allen 2577* (F, MO, US), shrub 2–3 m. tall, fls. lavender; El Valle de Anton, alt. 1000 m., June 16, 1946, *Allen 3535* (MO), shrub 3 m., fls. lavender; El Valle de Anton, North Hills, June 29, 1946, *Allen 3561* (C, F, MO, UC, US), shrub 2 m., bracts white, flowers pinkish lavender; Prov. Panama, summit of Cerro Campana, 800–1000 m., Sept. 1, 1940, *Allen 2226* (F), small tree, 3 m., fls. pink; trail 600–800 m. elev., Campana to Chica, Aug. 10, 1941, *Allen 2661* (LL); Prov. de Veraguas, vicinity Santa Fe, forested slopes of Cerro Tute, alt. 2500 ft., March 25, 1947, *Allen 4404* (MO), shrub 12 ft., fls. lavender; Isla de Coiba, Aug. 18, 1961, *John D. Dwyer 1612* (F), shrub 20 ft. tall, rachis and pedicels purple, petals white, pistil green.

It is probable that *A. Oliveri* Mast. is the oldest name for the species. I have not seen the type, and will defer recognition until the type collection can be studied.

A. Seibertii is very close to *A. opegrapha* Oerst. The range of the two species is the same, and some populations appear to be intermediate.

Typical *A. Seibertii* has broad larger sepals with less dense smaller punctations, petioles shorter and marginate to base, large panicles often tripinnate, and numerous ovules.

5. ARDISIA OPEGRAPHA Oerst., Vid. Medd. Kjoeb. 126. 1861.

NICARAGUA: Dept. Zelaya, Montañas y bosques lluviosus entre Toro Bayo y Esquipulas, drenajes de los Rios Jicaro y Esquipulas, alt. 130 m., Nov. 20, 1951, *Paul J. Shank & Antonio Molina R. 4610* (F, LL, US), arbusto 4 m.; bosque lluvioso y breñoso de Montaña Esquipulas, alt. 130 m., Nov. 22, 1951, *Shank & Molina 4696* (F), arbusto 3 m.; bosque lluvioso de montañas de Esquipulas y Aleman, drenaje de Rio Aleman, alt. 150 m., Nov. 27–29, 1951, *Shank & Molina 4766* (F), *4850* (F), planta 1 m.; matorrales y potreros humedos, drenajes de los Rios Punta Gorda, Aleman y Zapote, alt. 30 m., Dec. 5, 1951, *Shank & Molina 4966* (F), planta 0.5–1.5 m.

COSTA RICA: In monte Aguacate, November, 1846, *A. S. Oersted 29A* (C, F); in monte Jaris, November, 1846, *Oersted 29* (C); Aguacate, November, 1847, *Oersted 29A* (C, type); La Concepcion, Llanuras de Santa Clara, alt. 250 m., April, 1896, *John Donnell Smith 6677* (US); Bords de Rio Claro, Santa Clara, 300 m., July 21, 1899, *H. Pittier 13432* (US), 1 m. de haut; Cerro de San Isidro, pres San Ramon, July 10, 1925, *A. M. Brenes 4313* (F); entre Santiago y San Jose de San Ramon, October 17, 1928, *Brenes 6349* (F); San Miguel de San Ramon, July 21, 1934, *Brenes 19242* (F); "La Granja," Finca Vieja, Canton de Pococi, 260 m., July 26, 1936, *Fernando Solis Rojas 416* (F, MO).

PANAMA: Prov. de Botcas del Toro, Water Valley, Sept. 23, 1940, *H. von Wedel 932* (MO), shrub, 5 ft., flower white; vicinity of Chiriqui Lagoon, Oct. 9, 1940, *von Wedel 1109* (MO), plant about 6 ft., flower white; Water Valley, Nov. 5, 1940, *von Wedel 1536* (LL, MO), shrub 6 ft.; vicinity of Chiriqui Lagoon, Nov. 26, 1940, *von Wedel 1769* (MO), shrub 6 ft., infl. white, fruit red; Prov. de Veraguas, vicinity Santa Fe, forested slopes of Cerro Tute, 2500 ft., March 25, 1947, *Paul H. Allen 4404* (F), shrub 12 ft., fls. lavender.

The petiole of *A. opegrapha* is rather slender, canaliculate, and not marginate at base. Its narrow, oblong or elliptic-oblong, black-punctate sepals clearly mark the species.

Two collections from Nicaragua, *Shank & Molina 4719* and *4783*, have very broad sepals for this species, but with the characteristic punctation of sepals, and with slender petioles.

Ardisia alba Lundell, sp. nov.

Arbor, ca. 16 m. alta, glabra; ramuli crassi; folia petiolis usque ad 1 cm. longis stipitata; lamina oblanceolata, 12.5–21.5 cm. longa, 4–7.5 cm. lata, apice subabrupte acuminata, basi subcuneata, integra vel subintegra,

subcoriacea, glabra, puncticulata; inflorescentia terminalis, glabra, paniculata, usque ad 10 cm. longa, 12.5 cm. lata; pedicelli crassiusculi, 4–11 mm. longi; flores subcorymbosi, ante anthesin ca. 1.2 cm. longi; sepala crassa, ovata, 4.5–6 mm. longa, ciliolata; corolla ca. 1.3 cm. longa, basi connata 4–5 mm., intus glandulifera, petala oblongo-elliptica, carnosa; stamina ca. 9 mm. longa; filamenta crassa, ca. 4 mm. longa, glandulifera; antherae lanceolatae, ca. 6 mm. longae, poris apicalibus dehiscentes; ovarium glabrum; stylus ca. 8 mm. longus; ovula numerosa, pluriseriata.

MEXICO: Chiapas, Municipio of Jitotol, steep wooded slope on the bank of the Rio Hondo, 4 miles north of Jitotol on road to Pueblo Nuevo Solistahuacan, elev. 5500 feet, Feb. 12, 1965, *D. E. Breedlove 8962* (LL, type), tree 50 feet tall, flowers white; Municipio of Pueblo Nuevo Solistahuacan, slope with *Quercus*, *Pinus*, and *Liquidambar* at Clinica Yerba Buena, 2 km. northwest of Pueblo Nuevo Solistahuacan, elev. 5400 feet, Jan. 23–24, 1965, *Peter H. Raven & D. E. Breedlove 19918* (LL), tree 20 feet tall.

A. alba, named for its white flowers, is closely related to *A. sexpartita* Lundell. It differs in its rotate sepals and petals, much larger anthers, and inflorescences which dry almost white. In *A. sexpartita* punctation of the flowers is black, while in *A. alba* the glands are scarcely apparent.

In *A. alba*, *A. sexpartita* and *A. verapazensis* Donn. Sm., lower primary branches of the inflorescences often have flowers in two or three whorls below the apical corymb. This verticillate arrangement is notable, and possibly of sectional significance.

ARDISIA BARTLETTII Lundell, Contr. Univ. Mich. Herb. 7: 37. 1942.

PANAMA: Canal Zone, hills north of Frijoles, wet stream bank, December 19, 1923, *Paul C. Standley 27570* (US), shrub 10 ft., leaves thick, fruit white; Barro Colorado Island, Peña Blanca Trail, July, 1931, *D. E. Starry 178* (F), fls. pale pink; Barro Colorado Island, Standley Trail, July 31, 1934, *Otis Shattuck 1098* (F); vicinity of Salamanca Hydrographic Station, Rio Pequeni, ca. 80 m., July 28–29, 1938, *R. E. Woodson, Jr., P. H. Allen & R. J. Seibert 1569* (F), small tree 2 m., fls. pink; Barro Colorado Island, Snyder-Molina Trail, June 29, 1940, *M. A. Chrysler 4796* (F), shrub 4 ft., corolla rosy; Barro Colorado Island, Gatun Lake, along Wm. Morton Wheeler Trail, Aug. 8–10, 1940, *H. H. Bartlett & T. Lasser 16720* (LL, isotype of *A. Bartlettii*), a shrub, 6 ft. high, fls. and fruits pink.

The bracts and bractlets of *A. Bartlettii* are small and deciduous early. The species is not referable to the subgenus *Graphardisia*, to which I originally assigned it.

ARDISIA COMPRESSA H.B.K., Nov. Gen. & Sp. 3: 245. 1818.

Ardisia nicaraguensis Oersted, Vid. Medd. Kjoeb. 123. 1861.
Ardisia irasuensis Oersted, Vid. Medd. Kjoeb. 124. 1861.
Ardisia compressa H.B.K. var. *mexicana* Oersted, Vid. Medd. Kjoeb. 125. 1861.

MEXICO: Veracruz, Quatulco, October, 1842, *F. M. Liebmann 21* (C, type of *A. compressa* var. *mexicana*).

NICARAGUA: In monte Pantasmo, 4–5000 ft., January, *A. S. Oersted 23* (C, type of *A. nicaraguensis*).

COSTA RICA: in monte Irasu, 9000 ft., January, 1847, *Oersted 26* (C, type of *A. irasuensis*).

A. nicaraguensis is quite typical of *A. compressa*, but *A. irasuensis* and *A. compressa* var. *mexicana* have branchlets and inflorescences conspicuously furfuraceous (densely so in *A. irasuensis*). They may merit varietal recognition. Mez annotated all the specimens as *A. compressa*.

Oersted noted that the primary branches of the inflorescences were branched at base ("ternato-fasciculatis"), but this condition occurs in all populations of the species.

Ardisia ibaguensis Lundell, sp. nov.

Arbor glabra; ramuli graciles; folia petiolis 1–1.5 cm. longis stipitata; lamina subcoriacea, pallida, anguste lanceolato-elliptica, 9.5–13 cm. longa, 4–5.5 cm. lata, basi attenuata, acuminata, apice subabrupte acuminata vel late apiculata, integra, glabra; inflorescentia glabra, terminalis, parva, ca. 5 cm. longa, 4 cm. lata; flores umbellati, 5-meri; pedicelli graciles, 5–7 mm. longi; sepala oblongo-lanceolata, ca. 2 mm. longa, integra vel minute erosa, aurantiaco-punctata; bacca globosa.

COLOMBIA: Ibague, alt. 7–800 m., Aug. 2, 1952, *M. Koie 5138* (C, type; LL, fragment and photograph).

Referable to the Subgenus *Icacorea*, *A. ibaguensis* is notable for the attenuate base of the subcoriaceous leaf. Veins of the blade are very slender and scarcely discernible on either surface in the dried state. Although its sepals resemble those of *A. compressa* H.B.K., the umbellate flowers and completely glabrous inflorescences, as well as leaf differences, are features by which *A. ibaguensis* may be distinguished.

ARDISIA LIEBMANNII Oerst., Vid. Medd. Kjoeb. 129. 1861.

Ardisia crenipetala Mez, Pflanzenreich IV. 236: 91. 1902.

Ardisia Rekoi Lundell ex R. E. Schultes, Bot. Mus. Leafl. Harvard Univ. 9: 185, pl. VI. 1941.

MEXICO: Veracruz, Amatlan, July, 1842, *F. M. Liebmann 7A* (C, type of *A. Liebmannii*; LL, fragment of type); Mirador, 1843, *Liebmann 7* (C, LL, US); Orizaba, 1856, *M. Botteri 146* (GH, LL, isotypes of *A. crenipetala*); Orizaba, rocky slopes, May, 1905, *C. A. Purpus 1242* (F, LL, UC); Sierra Madre, between Misantla and Naolinco, Aug. 1912, *Purpus 6108* (UC). Oaxaca, District of Teotitlan, San Antonio Eloxochitlan, July 24, 1938, *Richard Evans Schultes & Blas Pablo Reko 273* (MICH, type of *A. Rekoi*), a small tree; Cerro de los Frailes, in dense rain forest, alt. 1800 m., Aug. 2, 1938, *Schultes & Reko 388* (LL), a small shrub, 2 m. tall; San Antonio Eloxochitlan, in forest

near arroyo, July 6, 1939, *Schultes 792*, a small tree 12–15 feet tall. Chiapas, Municipio of Tenajapa, slopes west of Tih Há in the Barrio of Kurus Pilal, alt. 330 ft., July 12, 1964, *D. E. Breedlove 6298* (LL), shrub 8 feet.

According to Schultes, the Mazatec Indians of San Antonio Eloxochitlan report that the small fruits are edible. The plant is referred to by the Spanish name *capulin* and by the Mazatec name *shka-na-tau*.

Ardisia lilacina Lundell, sp. nov.

Frutex glaber; folia petiolis 4–9 mm. longis stipitata; lamina elliptica, 7.5–15 cm. longa, 3.5–7 cm. lata, apice subacuminata, obtusa vel acutiuscula, basi acuta, subchartacea, subintegra; inflorescentia glabra, terminales, paniculata, usque ad 7 cm. lata, 4 cm. alta; flores corymbosi; sepala late ovata, 2–2.5 mm. longa, punctata, ciliolata et erosula; corolla ca. 8 mm. longa, paucipunctata; stamina ca. 4 mm. longa; filamenta crassa, ca. 1.2 mm. longa; antherae 3 mm. longae, poris apicalibus dehiscentes; ovarium glabrum; stylus ca. 4.5 mm. longus; ovula pluriseriata, numerosa.

PANAMA: Prov. Colon, Porto Belo, beach, July 13, 1964, *John D. Dwyer 4354* (MO, type), shrub 2.5 meters high, flowers lilac.

Probably only a variety of *A. Bartlettii* Lundell, this species differs in having elliptic larger usually obtuse leaves and less punctate but very similar flowers. It was collected several times in Panama by H. Pittier along beaches and near sea level (*Pittier 4114, 4273, 4311*).

Ardisia panamensis Lundell, nom. nov.

Ardisia pallidiflora Standl., Journ. Wash. Acad. Sc. 17: 523. 1927, not *A. pallidiflora* Ridley, 1912.

PANAMA: Chiriqui, humid forest between Alto de las Palmas and top of Cerro de la Horqueta, alt. 2100 to 2268 meters, March 18, 1911, *H. Pittier 3255* (US, type), shrub, corolla purplish white.

GENTLEA VENOSISSIMA (Ruiz & Pavon) Lundell, Wrightia 3: 103. 1964.

Ardisia meridensis Steyermark, Fieldiana, Bot. 28: 454, *fig. 95*. 1953.

VENEZUELA: State of Merida, between Mucuchachi and Canagua, alt. 1065–1820 meters, May 6, 1944, *Julian A. Steyermark 56325* (F, type of *A. meridensis*; NY, isotype), shrub 10–15 feet tall; leaves subcoriaceous, deep green and shining above, dull paler green below; pedicel pale greenish white; calyx pale greenish with brick-salmon on lobes; petals whitish, spreading; filaments whitish; anthers golden.

Steyermark compared his species with *Ardisia breviflora* A.DC. and *Ardisia Robinsonii* Mez, both of which are likewise synonyms of *Gentlea venosissima*.

STYLOGYNE LAEVIS (Oerst.) Mez, Pflanzenreich IV. 236: 268. 1902.

Ardisia laevis Oerst., Vid. Medd. Kjoeb. 125. 1861.
Stylogyne ramiflora (Oerst.) Mez, Pflanzenreich IV. 236: 272. 1902.
Ardisia ramiflora Oerst., Vid. Medd. Kjoeb. 132. 1861.

NICARAGUA: prope Tortuga, April, 1847, *A. S. Oersted 31* (C, type of *Ardisia ramiflora*).

COSTA RICA: monte Irasu, January, 1847, *Oersted 28* (C, type of *Ardisia laevis*).

In the original description of *Ardisia laevis*, Oersted cited two collections. The first is *A. S. Oersted 28* from "monte Irasu," dated January, 1847. This is a pistillate specimen, with axillary inflorescences on which his description is obviously based, which I have designated as the type. The second collection cited is from Mexico, *F. M. Liebmann 27*, without locality. The Liebmann specimen has a terminal inflorescence, with only flower buds present, and this appears to be referable to *Stylogyne guatemalensis* Blake. The confusion caused by Oersted's reference of the Liebmann Mexican collection to his *Ardisia laevis* is responsible largely for the use of that name for the plant now recognized as *Stylogyne guatemalensis*. Mez compounded the confusion.

The staminate collection, *Oersted 31*, the type of *Ardisia ramiflora* is referable to *Stylogyne laevis* (Oerst.) Mez, the name which has priority. Obviously Oersted did not recognize the dioecious state of the species.

WRIGHTIA

Volume 3

Index

Acacia, 185
Aesculus *discolor* var. *flavescens*, 132
  pavia, 133
  pavia var. flavescens, 132, 133
Agave lecheguilla, 185
Agostini, Getulio, 109
American Philosophical Society, 1, 22
Amsinckia intermedia, 138
  lycopsoides, 138
  micrantha, 138
Anacardiaceae, 6
Andresen, John W., 186
Anerma hispidula, 143
Antennaria, 48, 49
Anthurium, 161, 162
  tetragonum, 162
  tikalense, 161, 162
Arceuthobium ampylopodum, 186
  divaricatum, 186
Ardisia, 77, 88, 97, 100, 101, 112, 192
  adenanthera, 78
  alba, 195, 196
  amplifolia, 26, 113
  angustialata, 25, 26
  Austin-Smithii, 104, 105
  Bartlettii, 196, 198
  breviflora, 103, 198
  brevipes, 97, 98
  Carlsonae, 28
  compressa, 196, 197
  compressa var. *mexicana*, 196, 197
  Conzattii, 109
  coriacea, 27
  crenipetala, 26
  crenipetala, 197
  cucullata, 26, 27
  densiflora, 29, 100
  Donnell-Smithii, 99
  erythrocarpa, 27, 28
  escuintlensis, 98
  ferruginea var. *macrophylla*, 78
  Gentlei, 28, 29
  hirtella, 98, 99
  hyalina, 99
  ibaguensis, 197
  irasuensis, 196, 197
  laevis, 199
  Liebmannii, 197
  lilacina, 198
  McVaughii, 77, 106
  meiantha, 103
  meridensis, 198
  mexicana, 77
  micrantha, 78, 107
  minor, 104, 105
  Mitchellae, 28
  multilineata, 26
  nicaraguensis, 196, 197
  nigrescens, 98, 99
  nigrescens var. Donnell-Smithii, 99
  Oliveri, 195
  opegrapha, 193–195
  ovandensis, 112
  pallidiflora, 198
  panamensis, 198
  paquitensis, 192, 194
  paschalis, 27
  pectinata, 99
  pellucida, 100
  pellucida var. pectinata, 99, 100
  phaenostemona, 78

phaenostemona, 103
pulverulenta, 29
Purpusii, 112
ramiflora, 199
ramiflora, 199
Rekoi, 197
revoluta, 98, 100
Robinsonii, 103, 198
Schippii, 29
scoparia, 29
Seibertii, 193–195
sessiliflora, 100
sexpartita, 29, 30, 196
Skutchii, 194
spicigera, 29
staminosa, 78
staminosa, 107
subcoriacea, 192, 193
tacanensis, 77
tacanensis, 105
Tuerckheimii, 28, 98
Vatteri, 102
venosa, 90
venosissima, 101, 103
verapazensis, 196
Wagneri, 192, 193
Armoracia aquatica, 130
Arundo farcta, 159
Asimina parviflora, 130
Aublet, Fusée, 22
Azolla mexicana, 127

Balsaminaceae, 133
Barcena, 96
Bartlett, H. H., iii, 196
Bartonia, 188–191
paniculata, 189–191
texana, 190, 191
verna, 189
virginica, 189
Bauhinia Gentlei, 120
Berlandier, J. L., 126
Blomia, 9
prisca, 9
Boraginaceae, 137
Botkin, C. W., 186
Brosimum, 166, 167
belizense, 166, 167
Gentlei, 167
Ojoche, 167
terrabanum, 167
Brown, W. V., 42
Bursera, 4
longicuspis, 3
longipes, 3, 4
permollis, 3
Simaruba, 4
Simaruba var. yucatanensis, 4
Burseraceae, 3

Caballeria ferruginea, 109
venosissima, 103
Calyptranthes Chytraculia, 115
Chytraculia var. *americana*, 115
Lindeniana, 115
Lindeniana var. americana, 115
Campderia, 119
Capparidaceae, 161
Caprifoliaceae, 161
Capulin, 22, 198
Cardiospermum dissectum, 133
halicacabum, 133
Carex hirtella, 143
latifolia, 152
lithosperma, 146, 150, 159
mitis, 150
subulata, 146
tenuis, 146
Carter, Amon G. Foundation, 41, 52
Caryopitys, 181
Casearia Bartlettii, 122
Hintonii, 122
Celastraceae, 7
Celastrus scandens, 128
Cenchrus hirsutus, 143
Cistanthera, 24
Clusia Pringlei, 169
Salvinii, 169
Coccoloba, 117
barbadensis, 118
changuinolana, 120
escuintlensis, 119

Lehmannii, 119, 120
montana, 119
petenensis, 117, 118
Schippii, 119
Steyermarkii, 119
tenuis, 118, 119
viridis, 119, 120
Colubrina, 91
anomala, 96
arborescens, 91
asiatica, 96
Beccariana, 96
Berteroana, 94
californica, 94
celtidifolia, 94
cordifolia, 91
cubensis, 94, 96
cubensis var. Ekmanii, 95
cubensis var. floridana, 96
Ehrenbergii, 96
elliptica, 91, 92
glabra, 93
glandulosa, 91
glomerata, 96
Greggii, 94
Greggii var. *macrocarpoides*, 94
Greggii var. yucatanensis, 95
heteroneura, 93
lanulosa, 94
macrocarpa, 94
macrocarpa var. lanulosa, 94
macrocarpa var. macrocarpoides, 94
nipensis, 91, 92
obtusata, 95
oppositifolia, 91
pedunculata, 96
rufa, 91
rufa var. antillana, 92
rufa var. glandulosa, 91
rufa var. Reitzii, 91
sordida, 94, 95
spinosa, 93
spinosa var. mexicana, 93
stricta, 94
texensis, 94
texensis var. pedunculata, 94
travancorica, 96
Urbanii, 93
Vellozii, 92, 93
Vellozii var. latifolia, 93
Vellozii var. paranensis, 93
Vellozii var. Sprucei, 93
verrucosa, 93
viridis, 92, 93
Contreras, Elias, 1, 117
Copal, 1
Core, Earl L., 141
Cormonema, 91
mexicanum, 93
spinosum var. *latifolium*, 93
Sprucei, 93
Correll, Donovan S., 126, 188
Cory, V. L., 130, 132, 133, 134
Coulter, John M., 133, 134, 182
Critchfield, William B., 181
Croasdale, Hannah, 91
Crossopetalum, 7
eucymosum, 7, 8
filipes, 7
Gaumeri, 8
Gentlei, 8
macrocarpum, 8
Managuatillo, 8
oxyphyllum, 8
parviflorum, 8
puberulum, 9
riparium, 9
Standleyi, 9
Tonduzii, 9
Cruciferae, 130
Cupania *prisca*, 9
Schippii, 9, 10
spectabilis, 9, 10
Cypripedium Calceolus var. pubescens, 130
Cystopteris bulbifera, 127

Dasylirion, 185
De Candolle, A. P., 122, 126
Dentaria laciniata, 130
de Winter, B., 41

Dichapetalum, 173
axillare, 173, 174, 175
Brenesii, 175
bullatum, 173, 174
chiapasense, 175, 176
Donnell-Smithii, 173, 175, 176
Gentlei, 173, 174
Nevermannianum, 173, 174
Dichromena Vahlii, 158
Dicraspidia, 22, 24, 40
Didiplis diandra, 134
Dioscorea quaternata, 128
villosa, 128
Diospyros anisandra, 21, 32
bumelioides, 33
cuneata, 33
spectabilis, 34, 35
texana, 185
Yatesiana, 34
yucatanensis, 34, 35
Drimys, 169
Drummond, Thomas, 126

Ebenaceae, 32
Edwin, Gabriel, 132
Elaeocarpaceae, 21, 22, 23, 24, 36, 40
Emery, W. H., 42
Eragrostis, 41, 42, 43, 45, 46, 48, 52, 53, 55, 56, 57, 58, 59, 60
bicolor, 52, 53, 54, 55, 57
chloromelas, 41, 42, 43, 44, 46, 49, 50
cilianensis, 42
curvula, 41, 42, 43, 44, 46, 47, 48, 49, 50
heteromera, 42
intermedia, 42, 52, 54, 57, 58
Lehmanniana, 41, 43, 44, 46, 49, 50
obtusa, 52, 53, 57, 59
plana, 52, 54, 56, 57
robusta, 41
superba, 41, 43, 44, 45, 48, 49, 50, 54
Ervendberg, L. C., 126
Eugenia amatenangensis, 10
argyrea, 10, 11
axillaris, 17, 124
calciphila, 11, 12
Cantuana, 122
Capuli, 116, 123
Capuli var. Lindeniana, 123
chinajensis, 19, 116
comitanensis, 12, 13
cozumelensis, 13, 14, 17, 124
crenularis, 12, 13, 15
culminicola, 122
Doubledayi, 123
flavida, 14, 115, 116
flavoviridis, 115
guatemalensis, 11
guttata, 124
Hintonii, 14, 15
itzana, 14
Kellermanii, 116
Koepperi, 123
letreroana, 15, 123
Lindeniana, 15, 19, 20, 123
Lundellii, 12
michoacanensis, 16
minimiflora, 124
Mirandae, 122
nigrita, 16, 17
octopleura, 123
origanoides, 19
ovandensis, 17, 18
peroblata, 124, 125
pueblana, 122
riograndis, 18
rubella, 18, 19
sasoana, 15
savannarum, 124
tenuissima, 19
uliginosa, 20
ursina, 116
yautepecana, 20
Euonymus parviflorus, 8
Eupatorium glandulosum, 48
Euphorbia spathulata, 185

Fendlera linearis, 130
Ficus petenensis, 167, 168

Forchhammeria laxiflora, 168
Matudae, 168
trifoliata, 168
Forest Products Laboratory, 21
Fouquieria splendens, 185
Fraxinus Greggii, 185
Frazier, Vivien, 80, 81, 84, 85, 87, 89, 190

Gentle, Percy H., Frontispiece, 101
Gentlea, 97, 100, 101, 169, 198
McVaughii, 102, 106
micrantha, 102, 107, 169
minor, 101, 104
tacanensis, 102, 105
Vatteri, 101, 102
venosissima, 101, 103, 169, 198
Gillett, J. M., 188
Gould, F. W., 130, 133, 134, 182, 185
Gramineae, 42
Graphardisia, 192, 193, 196
Gray, Asa, 126
Guapira linearibracteata, 22
petenensis, 22
Gustafsson, A., 48
Guttiferae, 161
Gyminda costaricensis, 9
Tonduzii, 9
Gymnopodium floribundum, 21

Hackelia, 137
floribunda, 137
grisea, 137, 138
virginiana, 137
Hall, Marion T., 186
Hamamelidaceae, 1
Havard, V., 182
Hooker, William, 126
Howard, Richard A., 117, 118, 119, 120
Hybosperma, 91, 93
spinosum, 93
verrucosum, 93
Hypopitys sanguinea, 134
Hypoporum capillare, 146
diffusum, 145
distans, 142
gracile, 144
hirtellum, 143
humile, 143
interruptum, 142, 143
lithospermum, 146
micrococcum, 147
nutans, 143
purpurascens, 146, 147
Sieberi, 146
tenellum, 145
verticillatum, 145, 147

Icacorea, 26, 197
Ilex, 132
glabra, 132
montana, 132
verticillata, 132
Impatiens biflora, 133
capensis, 133
Institute of Jamaica, 117

Jacquinia, 114
albiflora, 114
aurantiaca, 114
aurantiaca var. albiflora, 114
Johansen, D. A., 43
Johnston, Ivan, 137
Johnston, Marshall C., 91, 126
Juniperus Ashei, 185
Deppeana, 188, 189
Deppeana var. Sperryi, 188, 189
monosperma, 185

Karwinski, Wilhelm F., 183
Killip, E. P., 163
Kirkham, Richard, 177
Kukachka, B. Francis, 21, 23, 36

Lauryl pentachlorphenate, 177–180
Leigh, J. H., 41
Linden, J., 16
Lindheimer, F. J., 126
Little, Elbert L., Jr., 181
Lovegrass, 41, 42, 52
Lundell, Cyrus Longworth, iii, 1, 21, 61, 77, 97, 114, 115, 117, 130, 132, 137, 161, 173, 177, 192

Lycium berberioides, 138
puberulum, 139
texanum, 139
Macbride, J. Francis, 101
Macrolomia bracteata, 153
Maheshwari, P., 44, 54
Mahogany, 1
Mansonia, 24
Mastigoscleria reflexa, 159
Matelea, 136
alabamensis, 136
edwardsensis, 135, 136
parvifolia, 137
radiata, 136, 137
reticulata, 136
sagittifolia, 137
Matuda, Eizi, 16, 168
Matudae, 168
Matudaea, 2
hirsuta, 1, 2
trinervia, 2
Matudai, 168
McCormick, Jack, 186
McVaugh, Rogers, 115, 123, 124, 125
Metopium, 7
Brownei, 7
Gentlei, 6, 7
toxiferum, 7
venusum, 7
Mexican pinyon, 183
Mez, Carl, 61, 192
Michaux Fund, 1, 22
Microtropis filipes, 7
parviflora, 8
Monotropa, 134
Hypopithys, 134
latisquama, 134
uniflora, 134
Moraceae, 161
Moore, J. A., 188
Morton, C. V., 163, 164
Mortoniodendron, 117
guatemalense, 117
Palaciosii, 120
Ruizii, 120, 121
vestitum, 121
Muntingia, 23, 40
Calabura, 22
Myginda, 7
eucymosa, 7
filipes, 7
Gaumeri, 8
Gentlei, 8
macrocarpa, 8
oxyphylla, 8
parviflora, 8
puberula, 9
riparia, 9
Standleyi, 9
Myrodia angustifolia, 122
Myrsinaceae, 25, 61, 77, 97, 101, 109, 161, 168, 192
Myrsine guatemalensis, 109
myricoides, 109, 110
venosissima, 103
Myrsineae, 111
Myrtaceae, 10, 115
Mystox, 177–180
National Science Foundation, 126, 191
Neomillspaughia emarginata, 21
Nyctaginaceae, 22
Oersted, A. S., 192, 197, 199
Ophryoscleria asperrima, 148
lucida, 150
microcarpa, 149
mitis, 150
paludosa, 148
Opuntia, 185
Ostrya, 129
Baileyi, 129
chisosensis, 128, 129
Knowltonii, 129
virginiana, 129
Palmer, E. J., 191
Parathesis, 31, 61, 71, 77, 97, 111, 161, 169, 192
acuminata, 125
adenanthera, 78, 79

Agostiniana, 108, 109
angustifolia, 79
aurantiaca, 79, 80, 82
belizensis, 61, 62
brevipes, 62, 64
Candolleana, 79
chiapensis, 62, 70
chrysophylla, 81, 82
columnaris, 62, 63, 65
Conzattii, 109
crassiramea, 30, 31
crenulata, 68
Donnell-Smithii, 62, 64, 65
Eggersiana, 62
elliptica, 63, 64, 68
emarginata, 64, 71, 72
ferruginea, 63, 64, 65
glabra, 82, 88
guatemalensis, 65, 66, 67
Hintonii, 82, 83
hondurensis, 66, 67, 68, 69
lanceolata, 32, 74
latifolia, 83, 84
laxa, 66
macronema, 75
macrophylla, 78, 79
mexicana, 66, 67, 73
micranthera, 78, 107
oblanceolata, 67
oblongifolia, 67, 68
obtusa, 83, 85, 86
oxyphylla, 67, 68
pallida, 31, 32, 69, 71
panamensis, 69
papillosa, 69, 70
parvifolia, 70
pleurobotryosa, 75, 76
prionophylla, 65
pyramidalis, 70, 71, 72
Rekoi, 75
reticulata, 64, 71, 72
reticulata var. sinuata, 71, 72
rosea, 67, 72
rubella, 78
rufa, 73
serrulata, 31, 32, 61, 65, 70
sessilifolia, 70, 73
Skutchii, 83
stenophylla, 86, 87
subcoriacea, 73, 74, 125
subulata, 74
tartarea, 86, 88, 89
tenuis, 74
tetramera, 70, 86
tomentosa, 74, 75
trichogyne, 69, 71, 82, 125
vestita, 75
villosa, 76, 109
vulgata, 88, 169, 170
Parks, H. B., 130, 132, 133, 134
Parnassia asarifolia, 131
Parrya, 181
Penrose Fund, 1, 22
Peplis diandra, 134
Petenaea, 22, 37, 40
cordata, 21, 23, 24, 25, 36
Phyllanthus viridis, 93
Physocarpus monogynus, 128
Pickeringia, 27, 30
Pinus, 181–187
cembroides, 181–183, 185, 186
cembroides var. cembroides, 182, 183
cembroides var. remota, 182, 183, 186, 187
edulis, 181–183, 185, 186
osteosperma, 183
Pinyon, 181–187
Pisonia linearibracteata, 22
Pittier, H., 198
Plinia, 125
peroblata, 124, 125
Polygala maravillasensis, 131
minutifolia, 131, 132
Polygonatum biflorum, 128
cobrense, 127
Polygonum, 44, 49, 50, 54
Proctor, George R., 117
Protium Copal, 4
Copal var. glabrum, 5

multiramiflorum, 5
Schippii, 5, 6
Quararibea parviflora, 121, 122
turbinata, 122
verticillaris, 122
Quercus, 185
Radlkofer, Ludwig, 9
Rapanea, 97
ferruginea, 110
Jelskii, 109
myricoides, 109
Reverchon, J., 136
Rhacoma, 7
eucymosa, 7
Gaumeri, 8
Gentlei, 8
lanceifolia, 8
macrocarpa, 8
Managuatillo, 8
oxyphylla, 8
parviflora, 8
puberula, 9
riparia, 9
Standleyi, 9
Tonduzii, 9
Rhamnaceae, 91
Rhus virens, 185
Rockefeller Foundation, 1
Rollins, Reed C., 130
Runyon, Robert, 133
Russelia campechiana, 35
campechiana var. *lilacina*, 35
lilacina, 35
syringaefolia, 35
Sambucus caerulea, 139
mexicana, 139
Sapindaceae, 9
Sapodilla, 1
Sargent, Charles S., 182
Schery, Robert W., 22
Schizolepis arundinacea, 152
latifolia, 151
silvestris, 151
trigonocarpa, 151
Schnella, 120
Schoenus latifolius, 158
lithospermus, 146, 150, 159
secans, 159
Scirpus lithospermus, 146
Scleria, 141
affinis, 158
areolata, 141, 148
arundinacea, 142, 151
asperata, 158
asperrima, 148
boliviana, 158
bracteata, 142, 153
bracteata var. *angusta*, 156
bracteata var. *floribunda*, 153
bracteata f. *simplicior*, 153
bracteata var. *supra-gynaecea*, 153
capillaris, 146
caricifolia, 159
caroliniana, 155
cenchroides, 143
ciliata, 142, 154
ciliata var. *Elliottii*, 154
ciliata var. *pauciflora*, 155
communis, 157, 158
conspersa, 158
costaricensis, 147
cyanocarpa, 151
debilis, 156
dictyocarpa, 156
diffusa, 145
distans var. *interrupta*, 142
Eggersiana, 142, 151
Elliottii, 154
elongata, 146
filiformis, 146
flagellata, 158
floribunda, 153
foliosa, 149
georgiana, 141, 144
glaucescens, 146
gracilis, 144, 146
grandifolia, 151
Grisebachii, 151
hemitaphra, 156
hirta, 143
hirtella, 141, 143

hirtella, 142, 154
hirtella var. *glabrescens*, 145
hirtella var. *pauciciliata*, 143
humilis, 143
interrupta, 141, 142
interrupta, 143
Kappleriana, 151
Krugiana, 146
Kunthiana, 145
lacunosa, 152
latifolia, 142, 152
latifolia, 149, 150, 151, 158
latifolia var. *arundinacea*, 152
latilacunosa, 156
laxa, 156
Liebmanni, 147
lithosperma, 141, 146
lithosperma var. *filiformis*, 146
lobulata, 159
Loefgreniana, 152
lucida, 150
luzulaeformis, 147
macrantha, 154
macrocarpa, 148
macrophylla, 141, 148
margaritifera, 158
melaleuca, 142, 157
Michauxii, 143
micrantha, 156
microcarpa, 142, 149
microcarpa, 151
microcarpa var. *foliosa*, 149
microcarpa var. *latifolia*, 149
micrococca, 141, 147
mitis, 142, 150
mollis, 143
Muhlenbergiana, 156
Muhlenbergii, 142, 156
nervosa, 152
nutans, 143
Oakesiana, 155
oligantha, 156
ottonis, 158
ovuligera, 149
palmifolia, 148
paludosa, 148
papillata, 153
pauciflora, 142, 155
pauciflora var. *caroliniana*, 155
pauciflora var. *effusa*, 155
pauciflora var. *Elliottii*, 154
pauciflora var. *kansana*, 155
pinetorum, 141, 146
Pittieri, 158
porphyrorhiza, 159
praealta, 150
pratensis, 158
pratensis var. *melanocarpa*, 157
pratensis var. *mucronata*, 157
pterota, 142, 158
pterota var. *melaleuca*, 157
pulchella, 143
purpurea, 146
reflexa, 159
Renggeriana, 159
reticularis, 156
reticularis var. *pubescens*, 156
rigens, 153
riparia, 150
scabra, 159
secans, 142, 159
Selloana, 158
setacea, 156
setacea var. *hemitaphra*, 156
silvestris, 151
simplicior, 158
subulata, 146
sylvestris, 151
tenella, 145, 147
tenuiflora, 145
tenuis, 146
Torreyana, 156
trialata, 150
trichopoda, 156
trigonocarpa, 152
trinitatis, 150
verticillata, 141, 145
verticillata f. *brevis*, 145
verticillata f. *capillaris*, 145
verticillata var. *tenella*, 145
Weigeltiana, 159
Wightiana, 146

Scrophulariaceae, 35
Serjania incisa, 133
Serrataria, 94
Shinners, L. H., 136
Shires, L. B., 186
Shka-na-tau, 198
Small, J. K., 127
Smilacaceae, 161–166
Smilax caudata, 162, 163
  domingensis, 163
  Engleriana, 163
  Gentlei, 163, 164
  lanceolata, 163
  Lundellii, 164
  mollis, 164
  Purpusii, 164
  rufa, 164
  subpubescens, 164, 165, 166
  venosa, 165, 166
Smith, C. Earle, Jr., 136
Smith, Lyman B., 21
Smithsonian Institution, 21
Sophora, 185
Sperry, O. E., 188, 189
Standley, Paul C., 10
Sterculiaceae, 24
Steyermark, Julian A., 10
Stover, E. L., 42
Streetman, L. J., 41, 43, 49, 52
Strobus, 181
Stylogyne, 97, 111, 199
  guatemalensis, 199
  laevis, 110, 111, 199
  nicaraguensis, 110
  phaenostemona, 78, 103
  ramiflora, 199
  Standleyi, 110, 111
Sudworth, George B., 182
Svenson, H. K., 127
Swartz, O., 192
Synardisia, 77, 88, 97
  venosa, 90

Tapeinosperma, 111
Taylor, George, 177
Tetragastris panamensis, 6
  Stevensonii, 6
Texas pinyon, 183
Thelypteris Phegopteris, 130
Theophrastaceae, 114
Tikalia, 9
Tiliaceae, 24, 117
Tinus adenanthera, 78
Torrubia petenensis, 22
Triplochiton, 24

University of Texas, 126
Urtica chamaedryoides, 129
  chamaedryoides var. Runyonii, 129

Valeriana arizonica, 140
  texana, 140
Vellozia, 92
Viburnum, 161
  amatenangense, 170
  disjunctum, 172
  Hartwegi, 172
  hondurense, 172
  lautum, 170
  mendax, 170
  Molinae, 170, 171
  optatum, 171
  optatum var. vagum, 171
  siltepecanum, 171
  subpubescens, 171, 172
Voss, Andreas, 182

Wallenia, 101
Walleniopsis, 77, 78, 100, 101
Warnock, Barton H., 131
Wells, P. V., 186, 187
Whitmore, T. C., 177
Williams, Louis, 114
Wislizenus, A., 183
Woodson, Robert E., 22
Wright, Neal, 41, 43, 49, 52

Xyris Elliottii, 127

Yucca, 185

Yuncker, T. G., 112
Yunckeria, 97, 111
  amplifolia, 111, 112, 113
  ovandensis, 112
  Purpusii, 112